1-1-2014

Assessing The Influence Of Religious Involvement On Health Behaviors Among Gender And Racial/ethnic Groups

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ASSESSING THE INFLUENCE OF RELIGIOUS INVOLVEMENT ON HEALTH BEHAVIORS AMONG GENDER AND RACIAL/ETHNIC GROUPS

by

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DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2014

MAJOR: SOCIOLOGY (Medical)

Approved by:

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Advisor Date

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DEDICATION

Thank God, from whom all blessings flow! I dedicate this accomplishment to my grandmother, Clara "Big ma" Johnson, it was through her examples of faith, strength, endurance, and humbleness, that I am the person I am today. May your soul forever rest in peace. I also dedicate this to my baby sister, La Tasha, whose bubbly spirit, sense of pride, and unselfish compliments, is truly missed. To my husband, Darrin Sr., I thank you for all that you have done to keep the household functioning. To my children: Darrin Jr., Dartanyan, and DiAira, I thank you for your love and support. To the new addition to our family, Dave III, your arrival could not have come at a better time.

I would be remiss not to say "Thanks" to those of you who have been so supportive throughout this journey. Harriette, Keydron, and Omari, thank you for being such great friends and for sharing all of the important things about sociology and the professoriate that has allowed me to gain the knowledge and experience I have today. Paula, thanks for helping me make it through prelims, your organization and support has been invaluable to my success. Sherida, thanks for being a lifelong friend. God was truly strategic in placing so many wonderful people in my life. To my family, church family, and many other friends, Thanks!

ACKNOWLEDGEMENTS

Dr. Hankin, your unyielding patience and guidance has been invaluable to my success. Thank you for providing structure, inspiration, and support – especially when "life" was happening. Thanks, to the best committee ever! Dr. Brown, Dr. Dillaway, Dr. Meyers, and a special "thanks" to Dr. Merolla – for your ceaseless efforts in helping me with statistics, I could never thank you enough for all that you have done. Dr. Dunbar and Dr. Zafar, I would not have been able to return to college had it not been for your guidance and financial support. To Carole Barduca – the support you provided during my moment of apprehension is irreplaceable – Thanks, for being there! To all of my coworkers at the Graduate School, you are the greatest! I could not envision working with a better group of people – Thanks for creating a work environment that was conductive to my completion and success.

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CHAPTER 1: Introduction

A growing body of literature has focused on the relationship between religious involvement and health (Koenig & Vaillant, 2009; Chatters, 2000; Meisenhelder, 2003). Many studies have shown that religious involvement is associated with positive mental health (Ellison et al., 2001; Bruce, 2005), healthy behaviors (Hill et al., 2006, 2007; Roff et al., 2005), higher levels of functional health (Benjamins and Brown, 2004), positive self-ratings of health (Musick, 1996), and decreased risk of mortality (Musick et al., 2004). While these outcomes show support on behalf of the salubrious effects of religiosity[1] on many aspects of health and well-being, there is still much to be explored regarding the complex associations between religion and health. Previous studies have used religious service attendance as the primary gauge for "religiosity." The use of service attendance as the sole measure of religious involvement does not adequately measure the contribution of religious activity to health. For example, the ability to regularly attend religious service may be related to the physical functioning of the individual. In essence, frequency of religious service attendance may be a consequence of good physical functioning rather than a cause of physical health (Ferraro and Koch, 1994). While studies have progressed and included other measures of religious activity, such as prayer and spirituality, they continue use very few measures to study religiosity and health. Not only have researcher limited their measurement of religiosity, many continue to focus their work on one or two health behavior outcomes. As a result, researchers tend to generalize findings about the relationship between religiosity and health from one form of religiosity or from an index of religiosity. Hill et al. (2007) assessed the relationship between religious involvement and healthy lifestyle. In this analysis, several religiosity and health behavior measures were used to create indices. While

[1] The terms religiosity, religious involvement, and religious activity will be used interchangeably throughout this work.

results supported the beneficial effects of religiosity, the use of indices in analyzing this effect made it difficult to determine whether specific forms of religiosity had a different impact on health behaviors and difficult to determine subgroup differences. The present study will extend previous efforts by assessing the effects of several public and private religiosity measures on several individual measures of health behaviors. This study will also assess whether public and private measures of health are moderated by race/ethnicity and gender.

In this analysis, public and private forms of religiosity will be used to assess the relationship between religiosity and health behaviors. Koenig et al. (2001, p20) describe several major dimensions of religiosity, two of which they describe as Organizational (public) and Nonorganizational (private)[2]. Public religiosity is conceptualized as attending religious services, at a church, synagogue, or temple or participating in religious social activities. Religious service attendance and religious participation are two forms of public religiosity that are assessed in this study. Nonorganizational, or private, religiosity is described as religious activity that does not require interaction with others (Koenig et al., 2001, p21). Private religiosity measures used in the present study are labeled as prayer, meditation, reading religious scripture, and using religious media. Public and private forms of religious activity are the independent variables, which will be described in detain in the methods section. Dependent variables used in this study include: general physical exam, dental care, vitamin use, alcohol abstinence, smoking abstinence, walking, moderate exercise, and strenuous exercise. This multidimensional approach makes it possible to independently analyze the effect of various forms of religiosity on individual forms of

[2] This study will discuss organizational and nonorganizational religiosity in terms of being public or private. Koenig (2001, pp 20-23) describes a total of 12 major dimensions of religiosity that are based in the work of several researchers. In addition to public and private dimensions of religiosity that will be discussed throughout this study, he describes religious beliefs, religious affiliation or denomination, subjective religiosity, religious commitment/motivation, religious quest, religious experience, religious well-being, religious coping, religious knowledge, religious consequences, as other major dimensions of religiosity.

health behavior. This study uses secondary data that was collected as part of the *2004 Survey of Texas Adults* (Musick, 2005) in order to conduct logistic and OLS regressions in the assessment of the relationship between religiosity and health behaviors and to assess interactions between religiosity and gender, and religiosity and race/ethnicity on health behaviors.

The three aims of this study are as follows:

1. To assess the relationship between public and private religiosity and health behaviors looking at the association between several measures religiosity and several health behaviors.
2. To determine if the effect of public and private religious activity on health behavior is moderated by gender.
3. To determine if the effect of public and private religious activity on health behavior is moderated by race/ethnicity.

Organization of Chapters. Chapter 2 provides a review of relevant literature, concluding with a description of how this study will address gaps in the literature. Chapter 3 describes the research methodology and sample characteristics. Results of preliminary analyses are also described in this chapter. Chapter 4 provides a discussion of the logistic regression results for preventive health measures: physical exam, dental exam and vitamin use. This chapter also provides a discussion on the interactions of religiosity, race/ethnicity and gender on three preventive health measures. Chapter 5 provides a discussion describing logistic regression outcomes for smoking and drinking abstention. Additionally, interaction effects will be described for religiosity, race/ethnicity, and two abstention measures. Chapter 6 provides an assessment of OLS regression analyses for physical activity measures: walking, moderate exercise, and strenuous exercise. This discussion will describe interactions between religiosity,

race/ethnicity and gender on three forms of physical activity. Chapter 7 includes an overall summary of the study, a discussion of the strengths and weaknesses of the study, directions for future research, and policy implications will be included in this chapter.

CHAPTER 2

Literature Review

This chapter will provide a brief historical description of the religion-health relationship. I will continue with a summary of previous studies, including their methods and results, followed by a description of the gaps and limitations that will be addressed by the present study. This chapter will conclude with a statement of the hypotheses that will tested.

Background: The Religion-Health Association. The relationship between religion and medicine is a phenomenon that has existed for centuries. It was a common responsibility of religious orders to care for the sick, and later, build and staff medical hospitals (Koenig et al., 2000). During the early era of civilization, Shamans were known to have power to commune with the spirits and heal the sick. Throughout the Middle-Ages most physicians were monks or priests and care for the sick was provided by the church. It was not until the Age of Enlightenment that the split between religion and medicine evolved as more medical institutions became funded by secular support (Koenig et al, 200). Although religious orders are not the sole providers of healthcare in the United States, many healthcare systems continue to be funded and operated by such institutions. The Catholic Church is a major stakeholder in the healthcare field, currently owning or overseeing the nation's largest group of not-for-profit health care sponsors, systems, and facilities (Niebuhr, 1994). Given that religion and spirituality have been found to play such an important role in the lives of patients, many U.S. medical schools have included the discussion of religion in their curricula (Gillum et al. 2008). Having an understanding about religious practices may give clinicians an idea about patient compliance.

Although most studies focus on the salubrious effects of religion on health, the evidence to support this relationship has been questioned. It is important to mention some ways in which

religion may have a negative influence on health. For example, there have been instances where religious extremists attempt to prove their faith by refusing to take lifesaving medications. There are also religious groups who refuse certain types of medical treatment, such as a Jehovah's Witness refusing to have a blood transfusion. Furthermore, groups such as Christian Scientists strongly discourage the use of medical care and advocate the use of prayer alone, for the treatment of even serious health conditions.

Public Religiosity

Religious service attendance is a form of public religiosity that has been found to provide the most consistent association with physical health, mental health, and mortality in community based samples (Ellison, 1995; Musick et al., 2004). Religious service attendance has often been used as the single measure of public religiosity. In 2006, Hill et al. used the 2004 Survey of Texas Adults to investigate the association between levels of religious service attendance and a range of health behaviors. This dataset is the one used in this dissertation. Hill and his colleagues used logistic regression to predict models which included twelve separate measures of health behavior and found that religious service attendance was related to an increased likelihood in performing positive health behaviors. Since differences between infrequent attenders – those who attend never/yearly – and weekly attenders are the most pronounced, the details of these results have been provided. Respondents who reported *weekly* attendance were 65% more likely to have had a well-patient exam in the past 12-months, 56% more likely to have had a routine dental exam in the past 12-months, and 68% more likely to use vitamins on a regular basis. Weekly service attendance was also associated with a 116% increased likelihood of infrequent bar attendance, a 120% increased probability of using a seatbelt on a regular basis, and a 103% increased chance of being a non-smoker. The likelihood of walking on five or more days per

week was increased by 73% with weekly attendance. The likelihood of participating in strenuous exercise on 3 or more days per week was increased by 84%. Respondents who reported weekly attendance were 182% more likely to report having four or fewer drinks per occasion. Service attendance, at any level, is associated with a decreased likelihood of reporting a sound diet quality – rated as excellent, very good, good – compared to yearly/never attendance. Other levels of religious service attendance were shown to have varying effects on health behaviors. Moderate exercise was the only health behavior that was not significantly related with religious attendance.

The results provided by the Hill (2006) study showed religious service attendance, at various levels, was associated with 11 out of 12 health behaviors. While the study did examine several health behavior measures, religious service attendance was the sole measure of religiosity. In the assessment of drinking behavior, a moderate drinker was described as having 4 or fewer drinks per occasion; however, the frequency of such "occasions" was not clearly defined. Based on the type of analysis utilized in the study it was impossible to determine how religious service attendance influenced group differences. For example, although it could be determined that Blacks were 72% more likely to have a physical exam compared to Whites, and males were 40% less likely to have a physical exam compared to females, one could not determine whether religious individuals in these groups engaged in healthier behaviors compared to individuals who were less religious. Therefore, the present dissertation will create interaction models testing the effects of religiosity on health behaviors, moderated by gender and race/ethnicity.

Preventive Health. Utilization of preventive health care services in the United States continues to remain low, although the use of exams and screenings can lead to early detection of

treatable diseases or illnesses (Koenig, McCullough & Larson, 2001; Vaidya et al., 2012). High levels of religious salience (the importance of religious and spiritual beliefs in day-to-day life) and religious service attendance have been associated with the increased likelihood of having flu-shots, cholesterol screenings, mammograms, pap exams, prostate exams, dental visits and participation in other positive health behaviors (Benjamins & Brown, 2004; Benjamins, 2006; Hill et al,2006; Aaron, Levine & Burstin, 2003).

A recent study conducted by Benjamins et al. (2011) assessed the relationship between religiosity by examining the effect of religious service attendance on congregational support, health related religious beliefs, and several preventive measures including cholesterol screening, flu shot, and colonoscopy. Male and female affiliates of the Presbyterian Church in the U.S., aged 18-96, were part of a two-wave national panel survey. In the assessment of preventive measures, at the bivariate level, the results of the study suggested that weekly religious service attendance was associated with a 65% greater likelihood of having a cholesterol screening in the past year compared to those who attended monthly or less. Respondents who attended religious services on a weekly basis were also 43% more likely to report having had a flu shot in the past year. Both respondents who attended religious services nearly every week and those who attended weekly were more likely to have had a colonoscopy, 44% and 68% respectively. This study also found that having health related discussions with church members was significantly related to the increased likelihood of receiving three health services. The study sample was predominately white, with only 3% of the sample being non-White and the average age of the sample was 60 years old.

Physical Activity. Over the past two decades there has been a dramatic increase in obesity among American children and adults. Based on key findings from the 2009-2010

NHANES study, 35.7% of adults and 16.9% of children and adolescents were labeled as being obese (NCHS, 2012). Obesity has been associated with chronic illnesses such as heart disease, hypertension, stroke, diabetes, and certain cancers. There are a number of behavioral, environmental, and genetic factors that contribute to obesity. One of many objectives set forth by *Healthy People 2020* is to increase the number of adults who engage in leisure-time physical activity, thus, improving quality of life by reducing the risk of illness, disability, and mortality (Healthy People.gov).

Few studies have focused on exploring the relationship between religion and obesity, rather, how religion is associated with physical activity. Kim and Sobal (2004) conducted a study among 193 males and 353 females in upstate New York county residents aged 17-91. The goal of the study was to explore religion and social support in relation to two health behaviors: fat intake and physical activity. Three measures were used to assess religiosity: frequency of religious service attendance or religious meetings, time spent in religious activities, and intrinsic religiosity. The third measure consisted of an index composed of three questions measuring intrinsic religiosity. The participants in the study identified as being part of one of the three denominational categories; Catholic, Conservative Protestant, Mainline Protestant. Those who did not identify as being a part of one of the specified denominations were identified as "other" or "non-religious/no preference." The significant results are as follows: 1) women who identified as Conservative Protestant or "Other" religious affiliation had higher levels of fat intake when compared to those affiliated with the Catholic denomination. 2) Prayer was related to increased levels of moderate physical activity among men. 3) Among women, giving money to religious causes or their congregation was related to increased levels of moderate and vigorous exercise.

Smoking. Statistics provided by the Centers for Disease Control show that tobacco use is the leading cause of preventable death. Smoking is associated with increased rates of cancer, health disease, stroke, lung disease, and diabetes. While 18.1% of all adults aged 18 years of age and older reported being a current smoker in 2012, these rates were lower among females (14.5%) compared to males (20.1%). Additionally, rates of cigarette smoking was lower among Hispanics (12.5%) compared to Blacks (18.1%) and Whites (19.7%). Surprisingly, national study statistics show that smoking rates are higher among non-Hispanic American Indians/Alaska natives (21.8%).

Gillum (2005) used data from the Third National Health and Nutrition Examination Survey (NHANES III) to assess the relationship between religious service attendance and cigarette smoking among a sample of Black, White, and Hispanic American; males and females. This study combined the use of self-reported cigarette smoking with blood collection to detect serum cotinine levels as a marker of smoking status. This provided validation that frequency of attendance was not associated with under-reporting of smoking behavior. Frequent attenders were described as those who attended religious services 24 times a year or more. The largest proportion of frequent attenders were described as being 60 years of age and older (52%), women (49.3%), and African American (51.3%).

Fifty-four percent of all respondents, aged 20 and older, reported having smoked at least 5 packs of cigarettes in their lifetime. At the time of being interview 52.8% who reported having ever smoked were current smokers. Groups with the largest proportion of current smokers were African American men (39.8%) and African American women (28.2%). Both, Hispanic males (30.6%) and female (14.8%) reported the lowest rate of smoking compared to their counterparts. Older respondents (15.7%) were least likely to current smokers compared to younger

respondents (32.4%). Blood samples were taken from 83% of the respondents who had a history of ever smoking. These samples were used to detect values for serum cotinine – which is directly proportional to absorbed nicotine. Those who had a value of <14ng/mL, were labeled as nonsmokers. The median concentration levels of serum cotinine for females (0.176 ng/mL) and males (0.307 ng/mL) who reported frequent attendance was lower compared to females (0.549 ng/mL) and males (2.17 ng/mL) who reported infrequent attendance. These results were consistent with the results for self-reported current smoking.

The results of Gillum's study provide an enhanced assessment of the association between religious service attendance and smoking behavior, through the use of blood test which provided a comparison of the self-reported smoking behavior. Although the use of cross-sectional studies cannot determine causation, it has been shown through the works of many researchers that increased levels of religious participation is associated with decreased levels or the absence of smoking (Roff et al., 2005; Hill et al., 2006). The present study moves beyond the work of previous studies by assessing the association between six measures of religiosity and smoking behavior. This study also determines if individual measures of religiosity have a differential effect on smoking behavior for gender and racial/ethnic groups.

Alcohol Behavior. Although there were no empirical research studies found which describe the association between religiosity and drinking behavior or alcohol abstention, national statistics have been provided. This lack of scholarly information may be due to the prohibition of alcohol consumption by various religious groups. The present study will provide data describing the association between religiosity and alcohol abstention and will discuss whether people who have high levels of religious participation are more likely to abstain from drinking compared to those with low levels of religiosity. The National Institute on Alcohol Abuse and Alcoholism

(2014) reports alcohol related deaths as being the third leading cause of preventable death in the United States. It has been estimated that 18 million Americans have an alcohol use disorder (AUD) – medical conditions classified as alcohol dependence or alcohol abuse. National data provided by the Substance Abuse and Mental Health Services Administration (SAMHSA, 2012) show that over seven percent of all U. S. adults aged 18 years and older were noted as having alcohol abuse or dependence. Males (9.9%) were noted as having higher levels of dependency or abuse compared to females (4.6%). Additionally, Hispanics (7.8%) had higher rates of alcohol dependency or abuse compared to Blacks (6.8%) and Whites (7.3%).

Private Religiosity

Prayer is defined as a form of private religious involvement that has been shown to be an effective form of religious coping (Pargament and Ano, 2006) and is often used as a means of coping with health problems (Brown et al., 2007). Currently, a growing number of studies have categorized this religious practice as one of many different forms of complementary and alternative medicine – CAM. Although the use of CAM is not considered to be a conventional form of medicine, there is the belief that prayer as a form of CAM can bring healing to both physical and mental health (Brown et al., 2004).

A study conducted by Gillum and Griffith (2009) found that the use of prayer differed by race and ethnicity. The study utilized data from 22,929 participants who were a part of the 2002 National Health Interview Survey that was conducted by the Centers for Disease Control. Respondents were non-institutionalized adults, aged 18 years and older. Gillum and Griffith examined differences in the use of several measures of prayer and non-religious spiritual practices[3] for health reasons among Hispanics, African Americans, and European Americans.

[3] The practices termed in this category have been commonly classified as complementary alternative medicine or CAM.

Based on the findings of the study, African Americans, women and older Americans were more likely to participate in all types of prayer which included: praying for their own health, having others pray for their health, participating in prayer groups and healing rituals. Interestingly, in the bivariate analysis of gender and prayer, solitary prayer (prayer for self) was more common in men compared to women and in European Americans compared to African Americans.

Using a national dataset from the National Health Interview Survey, Harrigan (2011) sought to determine if people who pray for their own health have different health related habits than people who do not pray for their own health. There were 22,341 study participants who responded to the question "Did you pray for your health?" Of the participants who responded to the question, 13,179 (59%) stated that they did pray for their health compared with 41% who did not. Of those who prayed for their own health 58.7% were male and 59.2% were female. Over half of the sample for Blacks (59.4%), Whites (58.9%), Asian (59.3%), and others (57.9%) stated that they prayed for their own health. When compared to those who did not pray, people who prayed for their health had higher rates of participation in health promoting activities such as visiting the doctor, having a flu shot, using at least one form of CAM, exercising, and using various relaxation techniques and support groups. The results of the Harrigan's study provided comparisons describing characteristics of those who prayed and did not pray for their health based on gender, race, and age. Additionally, behavioral habits of prayers and non-prayers were described. However, the study did not assess whether the effect of prayer on health promoting habits differed by groups.

Religiosity and Gender

Research has consistently provided evidence in support of higher levels of religiosity among females compared to males (Miller and Stark, 2002). While men are noted as being

greater risk takers compared to women (Courtenay, 2000), this phenomena does not provide a full explanation of these differences. Among a group of community based adults aged 65 and over, prayer was shown to be positively related to mental health for men (Meisenhelder, 2003). This finding that religiosity impacts elderly men's health is not surprising considering that the elderly population is noted as being more religious and more likely to adopt positive health behaviors. Another study provides support that religiosity is also important among younger and middle-aged men. Maselko & Kubzansky (2006) conducted a study hypothesizing that the effect of public religiosity would benefit men more than women. This was based on a sample of 1445; male and female respondents aged 18-65, taken from the 1998 US General Social Survey. The purpose of the study was to examine gender differences in the association between different aspects of spirituality/religiosity and measures of overall health and well-being. Frequency of religious service attendance and frequency of participation in other activities with religious groups, such as prayer meetings, bible study, choir practice, or adult fellowship meetings, where used as measures for public religious activity. Private religiosity was assessed by frequency of prayer, bible reading in the last year, and frequency of meditation. To assess spiritual experiences respondents were asked how often they feel God's love directly or through others', feel inner peace, feel God's presence, and feel touched by the beauty of creation. Health and well-being were assessed through measures of self-rated health, happiness and psychological distress. Other covariates included race, marital status, and family income. Overall, results of the study show that for men and women, weekly participation in public religious activities was associated with better self-rated health, lower psychological distress, and greater happiness. However, the magnitude of the effects was greater for men than women. Private religious

activity (prayer, bible reading, and meditation) and spiritual experiences were only significantly associated with higher levels of happiness for males and females.

Overview

Religious service attendance and prayer are the most commonly used measures in the study of public and private religiosity. As the study of religiosity continues to grow, additional measures assessing religious beliefs and practices have gained interest among researchers. For example, there is a growing trend in the study of the relationship between spirituality and health. Both religion and spirituality are multidimensional concepts that have been treated as synonymous by many researchers (Miller & Thoresen, 2003). In defining these concepts, future researchers must create operational definitions that are not too narrow, resulting in research with limited value, or too broad, resulting in a loss of distinctive characteristics of the concepts (Hill et al., 2000). The goal of this study is to determine if gender and racial/ethnic groups respond differently to public and private measures of religiosity in its impact on health behaviors.

Research Model

Figures 1A and 1B represents models of the proposed association between religiosity and health behaviors that emerge from the literature. Previous studies have established that a direct relationship exists between religious involvement and health behaviors; however, causality cannot be determined. In Figure 1A, race is shown to be related to religious involvement and health behaviors. Previous research has provided evidence suggesting that Blacks are more religiously involved (Chatters et al., 1999; Hunt & Hunt, 2001). On the other hand, Whites generally tend to lead healthier lifestyles and have better health outcomes (Center for American Progress, 2010) compared to Blacks. In the discussion of the religion-health phenomenon most studies involve the analyses of Black and White populations. The present dissertation will

include Hispanics in the model to be tested. Most importantly, this model will test the interaction between religious involvement and race/ethnicity in determining outcomes on health behavior.

In Figure 1B, gender is shown to have a direct relationship with religious involvement and health behaviors. This is supported by the findings of previous research which suggest that women are more religiously involved, particularly as it relates to religious service attendance. Additionally, women are more likely to participate in positive health behaviors compared to men. The present model suggests that gender will moderate the effect of religious involvement on health behaviors.

Figure 1A Model of religiosity, health behaviors, and race.

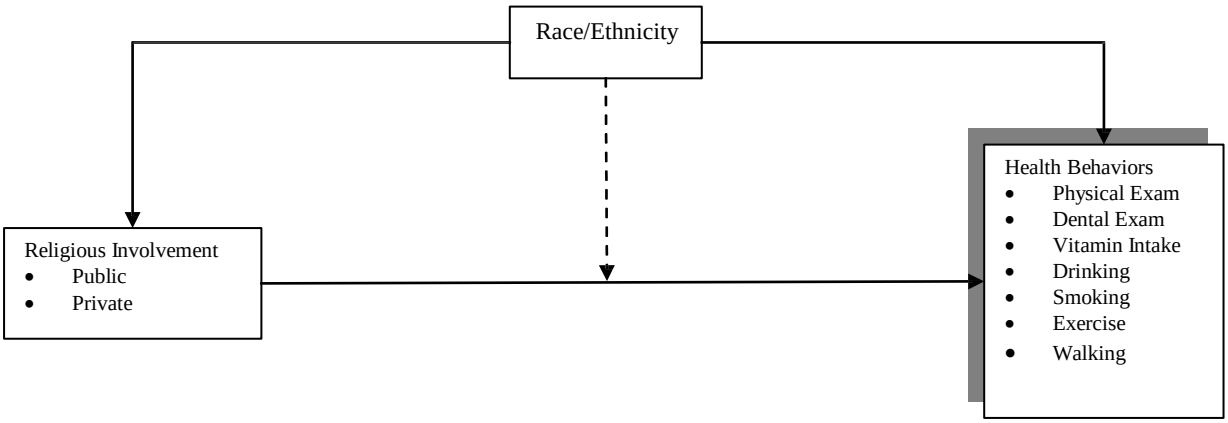
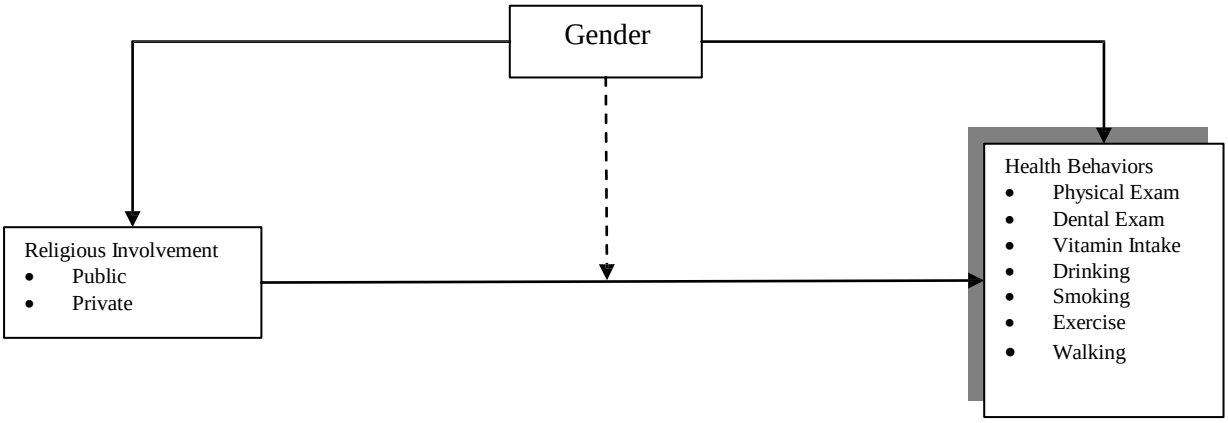


Figure 1B Model of religiosity, health behaviors, and gender.



The following hypotheses will be tested separately for each of the six measures of religiosity: religious service attendance, religious participation, prayer, meditation, reading religious scripture, and religious media. The analyses will be conducted controlling for age, educational attainment, and marital status. Denominational affiliation will not be used as a control; based on the frequency analyses, the majority of Blacks and Whites identified as being Protestant and Hispanic/Latinos identified as Catholic.

Hypotheses:

H1: There will be a significant relationship between public religiosity measures and health behaviors.

H2: There will be a significant relationship between private religiosity measures and health behaviors.

H3: Public religiosity measures will have a differential effect on health behaviors for Blacks, Whites, and Hispanics.

H4: Private religiosity measures will have a differential effect on health behaviors for Blacks, Whites, and Hispanics.

H5: Public religiosity measures will have a differential effect on health behaviors for males and females.

H6: Private religiosity measures will have a differential effect on health behaviors for males and females.

CHAPTER 3

Data and Methods

Data Source

The analyses conducted for this dissertation utilizes data from the 2004 Survey of Texas Adults. Marc A. Musick, University of Texas-Austin, was the Principal Investigator of this study and supervised the data collection process. This dataset was accessed through the Inter-University Consortium for Political and Social Research (ICPSR). The data used in this study is made available—in part—by the Population Research Center at the University of Texas at Austin and funding provided by the RGK Center for Philanthropy and Community Service and the College of Liberal Arts at the University of Texas at Austin (Musick, 2005). The 2004 Survey of Texas Adults is the first in a series of several data collection efforts aimed at learning more about several major aspects of the lives of adults who live in Texas. Data were collected from November 5, 2003 to January 29, 2004, with a respondent-level cooperation rate of 89%. Sampling was conducted using a computer assisted, random-digit-dial design. The sampling list was modified to eliminate known non-residential numbers. Phone interviews lasted approximately 35 minutes and Spanish-speaking interviewers were available based on the respondent's preference. The descriptive and preliminary results are based on the analysis of unweighted data.

Human Subjects. The present study utilizes secondary data for which the identity of the participants is unavailable to this researcher. The Interuniversity Consortium for Political and Social Research – ICPSR has taken strict measures to ensure that the identity of research subjects be protected. Adherence to all federal guidelines was maintained for the protection of the

respondents. Therefore, this study this study does not involve human subjects according to the Wayne State University – Institutional Review Board

Sample Demographics

Table 1A (shown below) provides the sociodemographic characteristics from the sample of 1417 respondents consisting of 544 men and 873 women. Respondents self-identified as being Black (n = 105), White (n = 976), or Hispanic/Latino (n = 336). Due to the small sample of those who self-identified as being Native American (n = 17), Asian (n = 14), and other (n = 40), they will not be included in the analysis. Of men who participated in the study, 34 self-identified as Black, 372 as White, and 138 as Hispanic/Latino. Of the women participants, 71 self-identified as Black, 604 as White, and 198 as Hispanic/Latina. The largest proportion of the total sample (40.9%) stated that the highest level of education they obtained was a high school diploma or GED; however, 39% of the sample stated that they received an associate's degree or higher. In assessing marital status, 60.7% of all respondents stated that they were married or partnered. The category for "not married" was recoded to include those who identified as widowed, divorced, separated, never married, or married but not living with their spouse. The largest proportion of Blacks (65.4%) stated that they are not married compared to 35.5% of Whites and 41.7% of Hispanics.

While there were many religious denominations listed in the survey, 50.1% of the respondents in this sample stated they were affiliated with some form of Protestantism and 26% were affiliated with the Catholic denomination. For the most part, Blacks and Whites identified as being affiliated with some form of Protestantism, 77.8% and 72.7%, respectively. Hispanics largely identified as being affiliated with the Catholic denomination, 71.3%. A small percent of the sample (8.3%) stated that they had no religious affiliation. The 15.7% that were coded as

missing comprised of those who refused to answer the question, responded "don't know," or were affiliated with one of many denominations for which the frequency was low. The average age of the sample was 44.63 with a standard deviation of 17.88. The largest proportion (39.2%) of the sample was between the ages of 25-44. The average age for Blacks was 41.15 with a standard deviation of 16.67; Whites, 47.62 with a standard deviation of 18.05; and Hispanics, 37 with a standard deviation of 15.1.

Based on the chi-square results presented in Table 1A, there is a significant difference between racial and ethnic groups on the basis of education, marital status, religious affiliation, and age. There was no significant difference in relation to gender; there were more female participants from all racial and ethnic categories represented in the study.

Compared to Blacks and Hispanic, a higher proportion of Whites were college educated, married or partnered, and aged 45 and older. Compared to Whites and Hispanics, a higher proportion of Blacks were affiliated with the Protestant denomination and completed high school or GED as their highest level of education.

Table 1B (shown below) presents the characteristics of the sample based on gender. Significant differences between males and females were found for education, religious affiliation, and age. The majority of women in the sample reported completing some level of formal education. While 44.1% of women in the study reported that the highest level of education they received was a high school diploma or GED, 46% reported receiving an associate's degree or higher. Among men in the sample, 36.1% reported a high school diploma or GED as their highest level of education and 54.6% reported having an associate's degree or higher. The largest proportion of both women and men identified as being married or partnered, 59.1% and 63.8%, respectively. The average age for the sample women was 46.35 with a

standard deviation of 16.48. The average age for the sample of men was 44.54 with a standard deviation of 16.39. Based on the results of an independent samples t-test (not shown) conducted to compare the mean age for males and females there was a significant difference in group age t (n=1388) = -1.999, p = .046, two-tailed. The largest proportion of women (74%) and men (73.8%) in the sample were between the ages of 25-64.

Based on the chi-square results for the crosstabs, there were significant gender differences related to education and religious affiliation. It appears that the largest proportion of men have an education beyond high school or GED compared to women. The largest proportion of women are affiliated with the Protestant religion compared to men.

Table 1A

Frequency Distribution of Unweighted Demographic Variables Based on Race/Ethnicity

	All N (%)	Black N (%)	White N (%)	Hispanic N (%)	X^2 (p-value)
Race/Ethnicity	1417 (100)				
Black	105 (7.4)				
White	976 (68.9)				
Hispanic	336 (23.7)				
Gender					2.656
					(.265)
Women	873 (61.6)	71 (67.6)	604 (61.9)	198 (58.9)	
Men *Total*	544 (38.4)	34 (32.4)	372 (38.1)	138 (41.1)	
Education	1417 (100)	105 (7)	976 (69)	336 (24)	
None					175.647
HS or GED					(.000)
Associate or Bachelor	136 (9.6)	8 (7.7)	37 (3.8)	91 (27.2)	
Graduate or Professional	579 (40.9)	47 (45.2)	394 (40.6)	138 (41.2)	
	549 (38.7)	40 (38.5)	416 (42.8)	93 (27.8)	
Marital Status	146 (10.3)	9 (8.7)	124 (12.8)	13 (3.9)	
Married or Partnered					36.513
Not Married					(.000)
Missing	860 (60.7)	36 (34.6)	628 (64.5)	196 (58.3)	
	553 (39)	68 (65.4)	345 (35.5)	140 (41.7)	
Religious Affiliation	4 (0.3)				
Protestant					329.714
Catholic					(.000)
None	710 (50.1)	63 (77.8)	590 (72.7)	57 (18.8)	
Missing [+]	368 (26.0)	10 (12.3)	142 (17.5)	216 (71.3)	
	117 (8.3)	8 (9.9)	79 (9.7)	30 (9.9)	
Age	222 (15.7)				
18-24					103.944
25-44					(.000)
45-64	148 (10.4)	17 (16.5)	70 (7.3)	61 (18.5)	
65+	556 (39.2)	46 (44.7)	335 (35)	175 (53)	
Missing	471 (33.2)	31 (30.1)	365 (38.1)	75 (22.7)	
	215 (15.2)	9 (8.7)	187 (19.5)	19 (5.8)	
Mean Age (standard deviation)	27 (1.9)				
	45 (17.9)	**41.2 (16.7)**	**47.6 (18.1)**	**37 (15.1)**	

Category totals may differ due to missing values.

[+]refused, don't know or other denomination

Table 1B

Frequency Distribution of Unweighted Demographic Variables Based on Gender

	Women N (%)	Men N (%)	X^2 (p-value)
Education			14.114 (.003)
None	86 (9.9)	50 (9.3)	
HS or GED	384 (44.1)	195 (36.1)	
Associate or Bachelor	326 (37.5)	223 (41.3)	
Graduate or Professional	74 (8.5)	72 (13.3)	
Marital Status			3.111 (.078)
Married or Partnered	515 (59.1)	345 (63.8)	
Not Married	357 (40.9)	196 (36.2)	
Religious Affiliation			12.909 (.002)
Protestant	457 (62.1)	253 (55.1)	
Catholic	224 (30.4)	144 (31.4)	
None	55 (7.5)	62 (13.5)	
Age			6.678 (.083)
18-24	80 (9.4)	68 (12.6)	
25-44	332 (39)	224 (41.6)	
45-64	298 (35)	173 (32.2)	
65+	142 (16.7)	73 (13.6)	
Mean (standard deviation)	**46.3 (16.5)**	**44.5 (16.4)**	

Category totals may differ due to missing values.

Measures

The 2004 Survey of Texas Adults was created to collect data that addressed various aspects of life among residents, aged 18 years and older. This dissertation will utilize several of many religion, health and demographic variables provided in the survey. Additionally, the survey contains a plethora of questions which measure attitudes and behaviors related to various aspects of civic engagement, volunteering, violence, mental and physical status. This dataset has been used in the academic research community and published in academic journals which include several articles published in *Preventive Medicine* and other journals such as *Annals of*

Behavioral Medicine, Health & Place, Social Science & Medicine, Social Science Quarterly, Journal of Empirical Legal Studies and *Journal for the Scientific Study of Religion.*

Independent Variables: Religiosity

The goal of the present study is to provide analyses of the net effects of religiosity on health behaviors through the use of several single-item measures of religion. Assessments will also be made to determine if interaction effects exist between measures of religiosity and gender *and* measures of religiosity and race/ethnicity, on health behavior outcomes. The religious variables that will be used in the present dissertation will be categorized in terms of their relation to one of two major dimensions of religiosity; public or private religiosity. As defined by Koenig et al. (2001), *public (organizational)* religiosity refers to the type of participation in which a person is actively involved in religious services such as attending church, synagogue, or temple or participates in religious social activities. This study will use two measures of public religiosity; religious service attendance and religious participation. Additionally, Koenig (2001) defines *private (nonorganizational)* religiosity as the type of religious activity that does not require interaction with others. In the analysis of private religiosity this study will use prayer, frequency of meditation, frequency of Bible reading, and use of religious media. Meditation is described as one of six types of prayer[4].

Table 2 (shown below) provides the questions for each of the variables that will be used to measure public and private religiosity. Unweighted frequencies for the categories of each variable are provided.

[4] Koenig (2001, p 21) defined six types of prayer: Petitionary involves making a specific request; Intercessory involves praying on behalf of someone else; Adoration involves giving praise, thanksgiving or displaying love towards God or divine being; Confession involves admitting to a sin or mistake and asking for forgiveness; Contemplative is nondirected and is without a specific goal; Meditation usually involves clearing the mind of thoughts and focusing something specific.

Public Religiosity. Based on the results obtained from the entire sample, 41.6% of the respondents stated that they attended religious service at least once a week. Fewer respondents (34.4%) stated that they did not attend religious service more than three times a month and 18.4% stated that they never attended religious services. The second measure of public religiosity is described as "religious participation" and has rarely been used in previous studies. Religious participation is defined as participation in activities and organizations of a church or place of worship that occur outside of religious services. A large proportion (40.6%) of the sample stated that they never participate in this form of public religiosity, while 37.5% participated no more than three times a month and 21.3% of the sample stated that they participated at least once a week.

Private Religiosity. Prayer is a measure that a growing number of studies are beginning to assess as measure of religiosity. It may be important to note that many studies categorize "prayer" as a form of Complementary and Alternative Medicine (CAM). CAM comprises a group of diverse medical and health care systems, therapies, and products that are not presently considered to be a part of conventional medicine (NCCAM, 2008). National level data reported by Barnes et al. (2004), have shown that prayer used specifically for health reasons was noted as being the most commonly used form of CAM therapy.

The present data reflects high levels of prayer among the sample with an overwhelming majority, 73.3%, stating that they prayed at least once a week. A small proportion of respondents (19.6%) stated that they prayed three times a month or less and 6.4% stated that they never prayed. Meditation is a form of private religiosity that has been described by Koenig (2001) as an activity that typically involves clearing the mind of thoughts and focusing on something specific. Meditation was not frequently used among the sample, 52% stated that they

meditated less than once a month or never. Only 16.7% of the sample stated that they meditated 1-3 times a month and 28.8% stated that they meditated one or more times each week. Religious scripture reading and use of religious media such as television, radio, tapes, and CD's, are a form of private religiosity that has rarely been measured in previous studies. Among the present sample 46.6% reported that they read religious scripture less than once a month or never. Fewer respondents, 23.4%, stated that they were frequent readers of religious scripture, stating that they did so one or more times a week. The use of religious media was frequent for 17.1% of the sample who stated that they used this form of religiosity at least once a week. The largest proportion of the sample, 42.5%, stated that they never used religious media, while 17.5% stated that they used it less than once a month and 22.2% stated that they used religious media 1-3 times a month.

Table 2

Frequency Distribution of Unweighted Religiosity Variables (IV)

Variable	Description	Frequency	Percent
	Public (organizational)		
Religious Attendance	How often do you attend religious services?		
	Never	**261**	**18.4**
	< once a month	**206**	**14.5**
	1-3 times a month	**282**	**19.9**
	Once a week	**417**	**29.4**
	Several times a week	**244**	**12.2**
Religious Participation	How often do you take part in the activities and organizations of a church or place of worship other than attending service?		
	Never	**576**	**40.6**
	< once a month	**242**	**17.1**
	1-3 times a month	**289**	**20.4**
	Once a week	**169**	**11.9**
	Several times a week	**133**	**9.4**
	Private (non-organizational)		
Prayer	How often do you pray?		
	Never	**90**	**6.4**
	< once a week	**79**	**5.6**
	Once or more a week	**198**	**14**
	Once a day	**551**	**38.9**
	Several times a day	**488**	**34.4**
Meditation	How often do you meditate?		
	Never	**578**	**40.8**
	< once a month	**159**	**11.2**
	Once or more a week	**236**	**16.7**
	Once a day	**297**	**21**
	Several times a day	**111**	**7.8**
Reading Religious Scripture	How often do you read the Bible or other religious scripture by yourself or with a small group?		
	Never	**363**	**25.6**
	< once a week	**297**	**21**
	Once or more a week	**413**	**29.1**
	Once a day	**249**	**17.6**
	Several times a day	**82**	**5.8**
Religious Media	How often do you watch religious programs on TV, listen to religious programs on the radio, or listen to religious tapes or CD's?		
	Never	**602**	**42.5**
	< once a month	**248**	**17.5**
	Once or more a week	**314**	**22.2**
	Once a day	**134**	**9.5**
	Several times a day	**108**	**7.6**

Note: Unweighted data. Category totals may differ due to missing values.

Dependent Variables: Health Behaviors

Cockerham (2010) defines health behavior as the involvement undertaken by individuals for the purpose of maintaining or enhancing their health, preventing health problems, or achieving a positive body image. The measures of health behavior that will be assessed for this study are as follows; having a general physical exam when well, having a routine dental exam, use of vitamins or dietary supplements, frequency of strenuous activity, moderate exercise, frequency of walking, smoking behavior and drinking. For the purpose of this dissertation the measures of health behavior will be sub-categorized into one of three headings: preventive health, physical activity, or smoking/drinking.

Table 3 (shown below) displays the frequencies obtained for each health behavior measure. Physical exam, dental exam, and vitamin use are listed under the subheading of preventive health. Since "yes" is the response of interest, indicating positive participation in the behavior, the three variables have been recoded so that 1 = Yes and 0 = No, for the purpose of forthcoming multivariate analyses. The frequencies for the measures on preventive health show that 69.7% of the sample reported having a well-patient physical exam within the past 12-months and 66.7% reported having a routine dental exam in the past 12-months. Over half of the sample, 54.4%, stated that they use vitamins on a regular basis.

This study uses three variables in the measure of *physical activity.* These include: moderate activity, strenuous activity and walking. The original data were measured as continuous variables with responses ranging from 0 to 7, which was representative of number of days per week the respondent participated in the specified activity. Due to low frequencies associated with several categories the data were collapsed. The data were recoded to reflect the following: 0 equals no participation (none), 1 equals 1 to 3 days of participation (moderate) and

2 equals 4 to 7 days of participation (high). The results for physical activity show that 55.9% of the respondents stated that they engaged in strenuous exercise at least one day a week, compared to 43.5% who stated that they did not participate in any form of strenuous exercise. Most respondents, 71.9%, stated that they participated in some form of moderate exercise at least one day during a typical week; however, the largest proportion (51.9%) of this group reported typical participation of 1-3 days/week. Close to 28% of the respondents stated that they did not participate in any form of moderate exercise. Physical activity in the form of walking was reported by 74.3% of the respondents. The largest proportion (39.2%) of respondents stated that they walked from 4-7 days per week, followed by 35.1% who typically walked 1-3 days/week. Only 25.2% of respondents stated that they did not take walks for purposes of pleasure, exercise or as a mode of getting to work. The use of original data categories will be resumed with OLS analyses.

In the assessment of drinking and smoking behavior, the variables were recoded so that "1" reflects the response of interest, abstention. The variable used to measure drinking behavior over a 12-month period was recoded so that "0 = Yes and 1 = No." Over half of the sample, 53.4%, stated that they did not have at least 12 drinks in the past 12 months. The question from the original study asked: Are you a current smoker, a former smoker or have you ever smoked? This question has been restructured to address current smoking status. For this dissertation, the data were collapsed to create dichotomous categories where "0 = Yes and 1 = No." Those who stated that they were former smokers were recategorized so that their current smoking status is equivalent to that of a non-smoker. The recoded data for smoking will be used in the current and subsequent analyses for this dissertation. An overwhelming proportion of the sample (81.2%) stated that they currently do not smoke. Of the 1150 respondents who were currently non-

smokers, 372 were former smokers and 778 never smoked. Drinking and smoking variables were coded to reflect non-participation in the behavior as being the characteristic of interest (SPSS 4th ed., p170).

Table 3

Frequency Distribution of Unweighted Health Behavior Variables (DV)

Variable	Description	Frequency	Percentage
	Preventive Health		
Physical Exam	Have you had a general physical exam by a doctor or other health professional when you were feeling well?		
	Yes	**988**	**69.7**
	No	**425**	**30.0**
Dental Exam	Have you had a routine dental cleaning or exam in the past 12 months?		
	Yes	**945**	**66.7**
	No	**464**	**32.7**
Vitamin Use	Do you regularly take vitamins or other dietary supplements for your health?		
	Yes	**771**	**54.4**
	No	**643**	**45.4**
	Drinking/Smoking		
Drinking	In the past 12 months, have you had at least 12 drinks of any alcoholic beverages? By a "drink" we mean things like a bottle of beer, a glass or wine, or a mixed drink.		
	Yes	**656**	**46.3**
	No	**757**	**53.4**
Smoking	Do you currently smoke?		
	Yes	**261**	**18.4**
	No	**1150**	**81.2**
	Physical Activity		
Strenuous Exercise	On how many days in a typical week do you take part in strenuous activities like running, swimming, chopping wood, bicycling, lifting weights, playing tennis or doing aerobics?		
	None	**617**	**43.5**
	1-3	**453**	**32.0**
	4-7	**338**	**23.9**
Moderate Exercise	In a typical week, on how many days do you engage in moderate exercise like playing golf, bowling, dancing, working in the yard, or gardening, but not including walking for exercise?		
	None	**389**	**27.5**
	1-3	**735**	**51.9**
	4-7	**283**	**20.0**
Walking	In a typical week, on how many days do you take walks, including walking to work, for exercise or for pleasure?		
	None	**357**	**25.2**
	1-3	**498**	**35.1**
	4-7	**555**	**39.2**

Note: Unweighted data. Category totals may differ due to missing values.

Statistical Approach

The statistical plan for this dissertation is to explore the independent effect of multiple measures of religious activity on multiple measures of health behavior. The sample will be described using bivariate measures and the hypotheses tested using multivariate analyses. Thus, this study will test hypotheses which state that 1) there is a relationship between religiosity and health behaviors, 2) the relationship between religiosity and health behaviors will differ for men and women, and 3) the relationship between religiosity and health behaviors will differ for Blacks, Whites, and Hispanics.

The first step in the statistical analysis involved the preliminary screening of the dependent and independent variables. This process included the production of frequency distribution, mean, and standard deviation of the variables. Crosstabs were conducted for each independent and dependent variable by the explanatory variable (gender and race). This confirmed that each subgroup was sufficient to continue with analysis. In addition, the chi-square results were used to identify the variables for which significant group differences occurred. A bivariate analysis was conducted among the independent variables to check for multicollinearity. Based on the correlation coefficients (not shown), there were low to moderate correlations between the variables. The correlation coefficient was greatest for the relationship between religious service attendance and religious participation (r = .663). The results for all associations were below the .9 value; therefore, multicollinearity was not an issue among these variables.

Based on the nature of the dependent variable both logistic and OLS regression analyses was conducted to predict health behaviors. Logistic regression was used to test the model for all variables assessing how well measures of religiosity explain the categorical health behaviors.

The following logistic regression equation was used to predict the dependent variable from the independent variables: [—] .

OLS regression was used to predict the relationship between the values of dependent variables: strenuous activities, moderate exercise, and walking, from the weighted independent variables. The following OLS equation was used in the analysis:

. Interaction terms were created for religion and race/ethnicity and religion and gender to determine if significant differences occur between groups. Models were analyzed controlling for education, marital status and age.

This study seeks to determine if there is a relationship between religiosity and health behavior. Moreover, to determine if there is a significant difference between groups based on gender and race/ethnicity, all else being equal. Health behavior was predicted using the following variables:

Multivariate analyses was conducted using standardized weighted variables that that are used to match the sample to the population along known demographic characteristics such as gender, race, age and education (Musick, 2004). SPSS Statistics 20 was used for statistical analyses and model testing.

Preliminary Results

The purpose of this study was to explore the association between religiosity and health behaviors, assessing the net effect of multiple religious measures on several measures of health behaviors. In conducting this study the importance was to determine if differences occur between gender and racial/ethnic groups. Non-parametric, chi-square analyses were used to explore the relationship between the categorical variables. Significant relationships are denoted

with an asterisk before the question. The results of subsequent preliminary analyses for the independent and dependent variables by race, ethnicity, and gender, are presented in the tables below. The tables include the research question for each variable, response frequencies and percentages, and chi-square coefficient test results.

Religiosity, Race & Ethnicity

Table 4 displays the results of cross-tabulations used to explore the relationship between the religious activity and race/ethnicity. Six categorical measures of religiosity were used as independent variables for the present study. The chi-square results (see table 4) were significant for all measures, this suggests that there is a significant difference between the groups in relation to their level of religious activity.

Public Religiosity

Based on activity frequencies, the largest proportion of Blacks, 60.3% stated that they attended religious services at least once a week, compared to 46.9% of Whites and 42.9% of Hispanics. The frequencies for religious participation, defined as activity and organizational participation outside of service attendance showed that 55.8% of Blacks participated at least 1 to 3 times a month compared to 43.4% of Whites and 33.6% of Hispanic/Latinos. However, the largest proportion of Hispanics, 53.9%, stated that they "never" participate in this form of activity.

Private Religiosity

In the assessment of prayer, the largest proportion of Blacks (89.5%) stated that they prayed one or more times a day while 72.8% of Whites and, 72% of Hispanics stated that they did the same. Although meditation can be defined as a form of prayer, this religious activity is less frequently used among the sample respondents. A moderate proportion of Whites (44.5%)

and Hispanics (40.9%) stated that they never meditated, compared to 21.2% of Blacks who answered never. Most Blacks (66.4%) reported using meditation at least once a week compared to 44.6% of Whites and 46.3% of Hispanic/Latinos. Black respondents (68.5%) were also more likely to read the Bible or other religious scripture at least one or more times a week, compared to 53.9% of Whites and 45.6% of Hispanics. In addition, a little over one-quarter of Whites and one-third of Hispanics stated that they "never" read religious scripture, compared to only 8.6% of Blacks. The measure on the use of religious media as a form of religious activity has rarely been discussed in previous literature. The crosstab results show that a large proportion of Blacks (74.2%) stated that they listened to or watched religious media compared to 36.7% of Whites and 35.4% of Hispanics. In relation to all other response options, 42.7% of Whites and 52.1% of Hispanics stated that they never used religious media. Forty-three percent of Whites and over half of Hispanics (52%) stated that they "never" listen to or watch religious media.

Based on the chi-square significance of the crosstab analysis, differences in religiosity exist between racial and ethnic groups. For all of the religious variables assessed, Blacks have significantly higher levels of religious activity compared to Whites and Hispanics. These crosstab analyses provide results that are consistent with the literature suggesting that higher levels of religious activity are found among Blacks.

Table 4

Crosstabs for Religiosity and Race/Ethnicity

Question	Coding	Blacks	Whites	Hispanics
Public (organizational)				
How often do you attend religious services? Label: Religious Attendance $X^2 = 37.022$, p = .000	1: Never 2: < once a month 3: 1-3 times a month 4: Once a week 5: Several times a week	10(9.5) 6(5.7) 26(24.8) 36(34.3) 27(25.7)	195(20.1) 153(15.8) 167(17.2) 277(28.6) 177(18.3)	56(16.7) 47(14.0) 89(26.5) 104(31.0) 40(11.9)
How often do you take part in the activities and organizations of a church or place of worship other than attending services? Label: Religious Participation $X^2 = 38.015$, p = .000	1: Never 2: < once a month 3: 1-3 times a month 4: Once a week 5: Several times a week	33(31.7) 13(12.5) 28(26.9) 16(15.4) 14(13.5)	362(37.4) 187(19.3) 207(21.4) 120(12.4) 93(9.6)	181(53.9) 42(12.5) 54(16.1) 33(9.8) 26(7.7)
Private (non-organizational)				
How often do you pray? Label: Prayer $X^2 = 48.370$, p = .000	1: Never 2: < once a week 3: Once or more a week 4: Once a day 5: Several times a day	0(0.0) 3(2.9) 8(7.6) 35(33.3) 59(56.2)	73(7.6) 61(6.3) 128(13.3) 361(37.4) 342(35.4)	17(5.1) 15(4.5) 62(18.5) 155(46.1) 87(25.9)
How often do you meditate? Label: Meditation $X^2 = 32.218$, p = .000	1: Never 2: < once a week 3: Once or more a week 4: Once a day 5: Several times a day	22(21.2) 13(12.5) 24(23.1) 26(25.0) 19(18.3)	422(44.5) 104(11.0) 161(17.0) 198(20.9) 64(6.7)	134(40.9) 42(12.8) 51(15.5) 73(22.3) 28(8.5)
How often do you read the Bible or other religious scripture by yourself or with a small group? Label: Reading Religious Scripture $X^2 = 43.549$, p = .000	1: Never 2: < once a week 3: Once or more a week 4: Once a day 5: Several times a day	9(8.6) 24(22.9) 38(36.2) 18(17.1) 16(15.2)	247(25.6) 197(20.5) 286(29.7) 187(19.4) 46(4.8)	107(31.8) 76(22.6) 89(26.5) 44(13.1) 20(6.0)
How often do you watch religious programs on TV, listen to religious programs on the radio, or listen to religious tapes or CD's? Label: Religious Media $X^2 = 79.412$, p = .000	1: Never 2: < once a week 3: Once or more a week 4: Once a day 5: Several times a day	15(14.3) 12(11.4) 39(37.1) 18(17.1) 21(20.0)	412(42.7) 194(20.1) 207(21.5) 83(8.6) 69(7.2)	175(52.1) 42(12.5) 68(20.2) 33(9.8) 18(5.4)

Category totals may differ due to missing values.

Religiosity and Gender

Table 5 provides the crosstab frequencies for measures of religiosity based on gender. The chi-square results were not significant for religious participation and meditation (see table 5 below). This suggests that there is no significant difference between males and females in relation to their level of participation in the aforementioned activities. The crosstab results for service attendance, prayer, scripture reading, and use of religious media suggest that there is an association between these religiosity measures and gender.

Public Religiosity

Religious services were frequented by both women and men, with 49.6% and 42.6% respectively stating that they attended religious services at least once a week. Although the groups are not significantly different, 44.9% of men stated that they never took part in *religious participation*, compared to 38.4% of women. Very few men (20.7%) and women (21.9%) reported frequent, weekly or more, participation in this activity.

Private Religiosity

An overwhelming proportion of women (81.3%) stated that they prayed at least once a day compared to 62% of men. Although there were no significant gender differences in the frequency of meditation, over half of male (54.4%) and female (50.6%) respondents stated that they did not meditate or did so less than once a week. Most men (54.5%) and women (42.3%) did not read religious scripture or participated on an irregular basis, less than once a week. The use of religious media is infrequent among these groups, with 48.1% of men and 39.5% of women stating that they never used this form of religiosity.

In conducting the crosstab analyses of religiosity and gender, the results are consistent with previous literature which states that females are significantly more likely to participate in religious activity when compared to men.

Table 5

Crosstabs for Religiosity (IV) and Gender

Question	Coding	Males (%)	Females (%)
Public (organizational)			
How often do you attend religious services? Label: Religious Attendance $X^2 = 13.042$, p = .011	1: Never 2: < once a month 3: 1-3 times a month 4: Once a week 5: Several times a week	122(22.6) 84(15.6) 104(19.3) 151(28.0) 79(14.6)	139(16.0) 122(14.0) 178(20.5) 266(30.6) 165(19.0)
How often do you take part in the activities and organizations of a church or place of worship other than attending services? Label: Religious Participation $X^2 = 7.423$, p = .115	1: Never 2: < once a month 3: 1-3 times a month 4: Once a week 5: Several times a week	243(44.9) 83(15.3) 103(19.0) 67(12.4) 45(8.3)	333(38.4) 159(18.3) 186(21.4) 102(11.8) 88(10.1)
Private (non-organizational)			
How often do you pray? Label: Prayer $X^2 = 86.578$, p = .000	1: Never 2: < once a week 3: Once or more a week 4: Once a day 5: Several times a day	57(10.6) 54(10.1) 93(17.3) 200(37.2) 133(24.8)	33(3.8) 25(2.9) 105(12.1) 351(40.4) 355(40.9)
How often do you meditate? Label: Meditation $X^2 = 5.403$, p = .248	1: Never 2: < once a week 3: Once or more a week 4: Once a day 5: Several times a day	230(42.3) 66(12.1) 96(17.6) 98(18.0) 41(7.5)	348(39.9) 93(10.7) 140(16.0) 199(22.8) 70(8.0)
How often do you read the Bible or other religious scripture by yourself or with a small group? Label: Reading Religious Scripture $X^2 = 35.281$, p = .000	1: Never 2: < once a week 3: Once or more a week 4: Once a day 5: Several times a day	179(33.3) 114(21.2) 152(28.3) 65(12.1) 28(5.2)	184(21.2) 183(21.1) 261(30.1) 184(21.2) 54(6.2)
How often do you watch religious programs on TV, listen to religious programs on the radio, or listen to religious tapes or CD's? Label: Religious Media $X^2 = 17.559$, p = .002	1: Never 2: < once a week 3: Once or more a week 4: Once a day 5: Several times a day	260(48.1) 103(19.1) 103(19.1) 39(7.2) 35(6.5)	342(39.5) 145(16.7) 211(24.4) 95(11.0) 73(8.4)

Category totals may differ due to missing values.

Health Behaviors, Race & Ethnicity

Table 6 provides the results of the assessment of health behaviors based on race and ethnicity. There were significant differences in the level of responses based on race and ethnicity for five of eight variables. In assessing the variables that were sub-categorized as "preventive health," the results show that there were significant differences between the groups for all three measures. The frequencies for the dichotomous data show that the largest proportion of respondents stated that they received a general physical exam. Seventy-six percent of Blacks, followed by 72% of Whites and 63% of Hispanics reported having an exam. The largest proportion of all racial/ethnic groups also stated that they had a routine dental cleaning or exam in the past 12-months. For this measure, 69% of Whites, followed by 63% of Hispanics and 57% of Blacks, reported having had a dental exam. In terms of using vitamins or other dietary supplements, the largest proportion of Whites (60%) stated that they do. Most Hispanics (58%) and Blacks (54%) in the sample stated that they do not take vitamins or supplements on a regular basis.

The only measure of physical activity for which there was a significant difference between groups was associated with walking. There was no significant race/ethnic based difference in relation to performing strenuous and moderate activities. As it relates to walking, there are significant differences based on race/ethnicity. Although there are significant differences in the levels of responses, the largest proportion of Blacks (53%), Hispanics (40%), and Whites (38%) reported walking 4-7 days per week.

There were no significant differences between groups in relation to drinking. While there was a significant difference between groups noted based on smoking status, the majority of the Hispanics (84%), Whites (82%), and Blacks (71%) stated that they did not currently smoke.

Table 6

Crosstabs for Health Behaviors (DV), Race, and Ethnicity

Question	Coding	Blacks	Whites	Hispanics
Preventive Health				
Have you had a general physical exam by a doctor or other health professional when you were feeling well? $X^2 = 11.545$, p = .003	0: No 1: Yes	25(23.8) 80(76.2)	275(28.3) 697(71.7)	125(37.2) 211(62.8)
Have you had a routine dental cleaning or exam in the past 12 months? $X^2 = 8.988$, p = .011	0: No 1: Yes	45(42.9) 60(57.1)	297(30.6) 673(69.4)	122(36.5) 212(63.5)
Do you regularly take vitamins or other dietary supplements for your health? $X^2 = 35.648$, p = .000	0: No 1: Yes	57(54.3) 48(45.7)	391(40.2) 582(59.8)	195(58.0) 141(42.0)
Physical Activity				
On how many days in a typical week do you take part in **strenuous activities** like running, swimming, chopping wood, bicycling, lifting weights, playing tennis, or doing aerobics? $X^2 = 1.440$, p = .837	0: none 1: 1-3 days 2: 4-7 days	45(43.3) 34(32.7) 25(24.0)	425(43.8) 305(31.4) 240(24.7)	147(44.0) 114(34.1) 73(21.9)
In a typical week, on how many days do you engage in **moderate exercise** like playing golf, bowling, dancing, working in the yard, or gardening, but not including walking for exercise? $X^2 = 1.500$, p = .827	0: none 1: 1-3 days 2: 4-7 days	30(28.8) 56(53.8) 18(17.3)	260(26.9) 508(52.5) 200(20.7)	99(29.6) 171(51.0) 65(19.4)
In a typical week, on how many days do you take **walks**, including walking to work, for exercise or for pleasure? $X^2 = 12.414$, p = .015	0: none 1: 1-3 days 2: 4-7 days	18(17.1) 31(29.5) 56(53.3)	263(27.1) 339(34.9) 369(38.0)	76(22.8) 128(38.3) 130(38.9)
Drinking & Smoking				
In the past 12 months, have you had at least 12 drinks of any alcoholic beverages? By a "drink" we mean things like a bottle of beer, a glass of wine, or a mixed drink. $X^2 = 4.524$, p = .104	0:Yes 1:No	38(36.5) 66(63.5)	462(47.5) 511(52.5)	156(46.4) 180(53.6)
Do you currently smoke? $X^2 = 9.611$, p = .008	0:Yes 1:No	31(29.5) 74(70.5)	175(18.0) 795(82.0)	55(16.4) 281(83.6)

Category totals may differ due to missing values.

Health Behaviors and Gender

Table 7, provides results of a crosstab analysis of health behaviors by gender. Of the three measures that were subcategorized as measures of preventive health, there are significant differences between the groups in relation to having a well-patient physical exam and regular vitamin use. A larger proportion of females (74%) stated that they had a well-patient exam compared to males (63%). There were also more females (60%) in the sample who stated that they regularly used vitamins or dietary supplements, compared to males (47%). There was no significant difference between groups in relation to having a dental exam.

When assessing the measures that account for physical activity, there is a significant difference between responses of males and females as it relates to strenuous activities and moderate exercise. The majority of men in the study (71.4%) stated that they participated in strenuous activity at least once a week while over half, 53.3%, of women stated that they never participate in weekly strenuous activity. Males also reported higher levels of participation in moderate exercise compared to women, 79.5% and 67.9%, respectively. Based on the chi-square results there were no significant differences noted between the groups in relation to frequency of walking.

In the assessment of drinking and smoking, significant differences are noted between the groups. The majority of women reported having fewer than 12-drinks in the past 12-months (60.8%), whereas, the majority of men (58%) reported having 12 or more drinks in the past 12-months. Low rates of smoking were reported among men (22%) and women (16.3%) who participated in the study.

Table 7

Crosstab for Health Behaviors (DV) and Gender

Question	Coding	Males (%)	Females (%)	X^2 (p)
Preventive Health				
Have you had a general physical exam by a doctor or other health professional when you were feeling well? $X^2 = 19.460$, p = .000	0: No 1: Yes	200(36.9) 342(63.1)	225(25.8) 646(74.2)	19.460 (.000)
Have you had a routine dental cleaning or exam in the past 12 months? $X^2 = 1.597$, p = .206	0: No 1: Yes	188(34.9) 350(65.1)	276(31.7) 595(68.3)	1.597 (.206)
Do you regularly take vitamins or other dietary supplements for your health? $X^2 = 22.866$, p = .000	0: No 1: Yes	290(53.5) 252(46.5)	353(40.5) 519(59.5)	22.866 (.000)
Physical Activity				
On how many days in a typical week do you take part in **strenuous activities** like running, swimming, chopping wood, bicycling, lifting weights, playing tennis, or doing aerobics? $X^2 = 93.010$, p = .000	0: None 1: 1-3 days 2: 4-7 days	154(25.5) 200(37.0) 186(34.4)	463(53.3) 253(29.1) 152(17.5)	93.010 (.000)
In a typical week, on how many days do you engage in **moderate exercise** like playing golf, bowling, dancing, working in the yard, or gardening, but not including walking for exercise? $X^2 = 23.818$, p = .000	0: None 1: 1-3 days 2: 4-7 days	111(20.5) 302(55.8) 128(23.7)	278(32.1) 433(50.0) 155(17.9)	23.818 (.000)
In a typical week, on how many days do you take **walks**, including walking to work, for exercise or for pleasure? $X^2 = 4.388$, p = .111	0: None 1: 1-3 days 2: 4-7 days	140(25.9) 173(32.0) 227(42.0)	217(24.9) 325(37.4) 328(37.7)	4.388 (.111)
Drinking & Smoking				
In the past 12 months, have you had at least 12 drinks of any alcoholic beverages? By a "drink" we mean things like a bottle of beer, a glass of wine, or a mixed drink. $X^2 = 47.546$, p = .000	0: Yes 1: No	314(58) 227(42)	342(39.2) 530(60.8)	47.546 (.000)
Do you currently smoke? $X^2 = 7.270$, p = .007	0:Yes 1:No	119(22.0) 421(78.0)	142(16.3) 729(83.7)	7.270 (.007)

Category totals may differ due to missing values.

CHAPTER 4

Religiosity and Preventive Health

Logistic Regression Analyses

In the analysis of religiosity and health behaviors this study seeks to address the following questions: 1) Do public and private religiosity and sociodemographic measures have an effect on health behavior? 2) Does the effect of public and private religiosity (and covariates) on health behavior differ by race/ethnicity? 3) Does the effect of public and private religiosity (and covariates) on health behavior differ by gender?

Chapters 4 and 5 provide results describing the association between five dichotomous measures of health behavior and six measures of religiosity. Logistic regression analyses are performed using the following dependent variables: general physical exam, general dental exam, and regular vitamin/supplement use (chapter 4); smoking and drinking abstention (chapter 5). Six religiosity measures included: religious service attendance, religious participation, prayer, meditation, reading religious scripture, and use of religious media. Race, gender, marital status, education and age are covariates analyzed in each model. Race, gender and marital status are dichotomously coded and age and education are analyzed as continuous variables. For gender, MALE[5] is coded 1 and female 0. For race, where BLACK[5] is coded 1, White and Hispanic (non-Black) are grouped and coded 0. Where HISPANIC[5] is coded 1, White and Blacks (non-Hispanics) are grouped and coded 0. Married/partnered is coded 1 and other is coded 0. Subsequent tables will be labeled using a numeric-alpha pattern, where the table number will correlate with the section, followed by letters which represent tables displaying logistic regressions (A), religiosity and race/ethnic interactions (B), and religiosity and gender

[5] Variables for gender and race/ethnicity that are coded as 1 (variable of interest) may be listed in all caps.

interactions (C). For Tables B and C, all covariates are entered but results are not shown in the tables.

Physical Exam

Table 8A presents the results of logistic regression analyses that were conducted to assess the relationship between measures of religiosity and having a general physical exam by a doctor or health professional when feeling well. In the full model (model 1), religious participation and religious media are shown to have a significant effect on having a general physical exam. However, the relationship between religious media and having a general exam is negative. Based on this finding, a one unit increase in the level of religious media use reduces the odds of having a physical exam by 11%, $p<0.05$. Conversely, religious participation has a significant positive effect on having a physical exam. As a result, those who participate in religious activities and organizations other than attending services are 22% more likely to have had a physical exam, $p<0.01$. This significant positive relationship is maintained in model 3, where religious participation is analyzed as the sole measure of religiosity. Results for other models show a significant positive relationship between several forms of religiosity and having a general physical examination. Among the sample, increased levels of religious service attendance are associated with a 16% increase in the likelihood of having a well-patient exam (model 2); increased levels of religious participation are associated with an 21% increase in the likelihood of having a well-patient exam (model 3); prayer is associated with an 12% increase in the likelihood of having an exam (model 4); and reading religious scripture increases the likelihood of having an exam by 11% (model 6). There is no significant relationship noted for meditation and religious media when entered as predictors, as shown in models 5 and 7.

In models 1 and 5, Blacks were 54% more likely to have a physical examination compared to Whites, $p<0.05$. There is no significant difference between Hispanics when compared to Whites, in having a physical exam, this effect was seen across all models. MALE is shown to be negatively associated with having a physical examination; being male reduces the odds of having a physical examination by 40 to 44 percent, across models. Therefore, females are significantly more likely to have a physical exam compared to males. Marital status is not a significant predictor of having a physical examination. Across models, education and age are significant, positive predictors of having a general physical examination. Thus, every one-unit increase in the level of education increases the odds of having a physical exam, from 31-38%. An increase in age increases the odds of having a physical exam by 3%.

Overall, religious participation is the only religiosity measure that is significantly associated with an increased likelihood of having a general physical exam, for both full (model 1) and individual (model 3) models. In the individual models, religious attendance, prayer, and religious scripture reading are related to the increased likelihood of having a physical exam. Meditation (models 1 and 5) was not a significant predictor of having a physical exam for either the full or individual model. Religious media use (models 1 and 7) was significant in the full model, but not in the individual model. In model 5, the assessment of meditation shows that Blacks are significantly more likely to have a physical examination. There are no significant relationships noted for HISPANIC. Across all models, men are significantly less likely to have a physical exam, marital status is not significantly related to having a physical exam, higher education increases the likelihood of having a physical exam and older age is associated with the increased likelihood of having a physical exam.

Table 8A

The effects of Religiosity on Physical Examination

(Logistic Regression)

MODEL	1	2	3	4	5	6	7
Religious Attendance [a]	.023	.145**					
	(1.024)	(1.156)					
Religious Participation [a]	.201**		.190***				
	(1.223)		(1.209)				
Prayer [b]	.097			.114*			
	(1.102)			(1.121)			
Meditation [b]	-.006				.039		
	(.994)				(1.040)		
Religious Scripture [b]	.011					.103*	
	(1.011)					(1.109)	
Religious Media [b]	-.114*						.003
	(.893)						(1.003)
BLACK	.433*	.329	.330	.340	.432*	.371	.411
	(1.542)	(1.390)	(1.392)	(1.405)	(1.540)	(1.449)	(1.508)
HISPANIC	-.036	-.150	-.073	-.142	-.085	-.108	-.123
	(.964)	(.861)	(1.392)	(.868)	(.918)	(.898)	(.885)
MALE	-.531***	-.553***	-.575***	-.511***	-.542***	-.537***	-.567***
	(.588)	(.575)	(.563)	(.600)	(.582)	(.584)	(.567)
Married/Partnered	.151	.174	.165	.202	.188	.212	.208
	(1.163)	(1.190)	(1.179)	(1.223)	(1.207)	(1.236)	(1.231)
Education	.270**	.291***	.268**	.296***	.318***	.297***	.304***
	(1.310)	(1.337)	(1.308)	(1.344)	(1.375)	(1.346)	(1.356)
Age	.031***	.027***	.029***	.026***	.028***	.027***	.027***
	(1.031)	(1.028)	(1.030)	(1.027)	(1.029)	(1.028)	(1.028)
Constant	-1.682***	-1.321***	-1.335***	-1.320***	-1.128***	-1.204***	-.951**
Nag R^2	.148	.136	.141	.127	.129	.130	.126
Hosmer and Lemeshow X^2	17.713	7.976	16.951	23.382	13.072	14.890	13.074
(significance)	(.023)	(.436)	(.031)	(.003)	(.109)	(.061)	(.109)
Log likelihood	1641	1708	1701	1712	1674	1712	1718

Standardized data weights used in analysis

Physical exam: Yes = 1, No = 0

b coefficient (odds ratio)

[a] 1 = Never, 5 = Several times a week

[b] 1 = Never, 5 = Several times a day

***p< 0.001

**p< 0.01

*p< 0.05

Interactions

An interaction effect occurs when the effect of one independent variable on the dependent variable depends on the level of a second independent variable (SPSS Survival Manual, 4thed). In general, interactions are used to help determine whether religious individuals engage in healthier behaviors than individuals who are less religious. Interactions are used to describe the effect of public and private religiosity measures on health behaviors for males and females; Blacks, Whites, and Hispanics. These analyses include assessments for covariates on gender, marital status, education, and age. All results for racial/ethnic interactions are presented in table numbers that have the letter-B affixed, and all results for gender interactions are presented in table numbers that have the letter-C affixed. Significant interactions have been calculated: ($e^{\wedge}$) ($\beta_{\text{main effect}} + \beta_{\text{interaction effect}} =$ odds ratio) to provide a percentage for the odds ratio.

Religiosity, Race/Ethnicity and Physical Exam

In Table 8B, all main effects for religiosity are found to be insignificant. Thus, Whites who participate in various religious activities are no different than Whites who do not participate in religious activities, in having a physical examination. The significant main effect for BLACK (b=1.104, sig. =.044) in model 5, suggests that when levels of reading religious scripture equals 1, Blacks are more likely to have general physical exam compared to Whites. The interaction effect for this model was found to be insignificant. This suggests that reading religious scripture has no significant differential effect on having a physical examination based on race.

Although there are no significant main effects for religiosity in model 4, there is a significant interaction effect between BLACK and meditation (b=.363, sig= .016). This suggests that there is a significant difference in the effect of meditation on having a general physical examination for race groups. Among Blacks, as meditation increases by one-unit, the odds of

getting a physical exam increase by 36%. There is no effect of meditation on getting a physical exam among Whites.

In models 1, 2, 3, and 5, both the main effect and interactions for the variable labeled HISPANIC are significant. Significant, negative main effects for these models suggests that Hispanics are less likely to have a physical exam compared to Whites, when level of religious activity equals one. Moreover, significant interaction effects show that religious service attendance (b=.303, sig = .002), religious participation (b=.476, sig = .000), prayer (b=.322, sig = .005), and reading religious scripture (b=.270, sig = .010) has a differential effect on having a physical exam for Hispanics. Among Hispanics, a one-level increase in religious attendance increases the odds of having a physical exam increase by 42%, religious participation increases the odds of having a general physical exam increase by 65%, prayer increases the odds of getting a physical exam increased by 35%, and religious scripture increases the odds of getting a physical examination by 32%.

Among covariates, an increase in education and age is consistently associated with having a general physical examination (not shown). There is no significant association between marital status and having a physical exam (not shown).

Table 8B

Interaction between Religiosity and Race/Ethnicity on Physical Exam

(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.049 (1.050)					
Religious Participation [a]		.026 (1.027)				
Prayer [b]			-.022 (.978)			
Meditation [b]				-.053 (.949)		
Religious Scripture [b]					.009 (1.009)	
Religious Media [b]						-.060 (.941)
BLACK	1.111 (3.037)	.586 (1.797)	-1.086 (.337)	-.515 (.598)	1.104* (3.017)	.280 (1.323)
HISPANIC	-1.040** (.353)	-1.013*** (.363)	-1.346** (.260)	-.337 (.714)	-.726** (.484)	-.396 (.673)
RA X Black	-.206 (.814)					
RA X Hispanic	.303** (1.353)					
RP X Black		-.072 (.931)				
RP X Hispanic		.476*** (1.609)				
Pray X Black			.355 (1.426)			
Pray X Hispanic			.322** (1.380)			
Med X Black				.363* (1.438)		
Med X Hispanic				.116 (1.123)		
RS X Black					-.225 (.798)	
RS X Hispanic					.270* (1.310)	
RM X Black						.062 (1.064)
RM X Hispanic						.136 (1.146)
Constant	-1.113***	-.955**	-.780*	-.949**	-1.027**	-.816**
Nag R^2	.148	.164	.135	.135	.140	.128
Hosmer and Lemeshow X^2	9.515	33.427	24.024	11.930	7.328	15.901
(significance)	(.301)	(.000)	(.002)	(.154)	(.502)	(.044)
Log likelihood	1693.310	1674.435	1703.016	1668.199	1700.616	1715.942

Standardized data weights used in analysis

Physical exam: Yes = 1, No = 0

b coefficient (odds ratio)

[a] 1 = Never, 5 = Several times a week

[b] 1 = Never, 5 = Several times a day

***p< 0.001

**p< 0.01

*p< 0.05

Religiosity, Gender and Physical Exam

Table 8C provides the results of interaction effects for religiosity and gender. Across all models, the main effect for religiosity is shown to be insignificant. This suggests that females who participate in religious activities are no different than females who do not participate in religious activities when it comes to having a physical examination. In models 1, 2, 4 and 6 the main effect for MALE has a significant negative effect on having a physical exam. Thus, when religious activity status equals 1, females are more likely to have physical examinations compared to men.

Interaction effects in models 1 and 2 are shown to be significant. In model 1, the interaction between religious service attendance and Male (b=.211, sig =.018) show that the effect of religious service attendance on having a physical exam is moderated by gender. Males with higher values on the religious service measure are more likely to have a physical exam when compared to males with lower levels of religious attendance. Among males, for every one unit increase in religious attendance, the odds of getting a physical exam increase by 28%, compared to females. In model 2, significant interaction effects between religious participation and MALE (b=.223, sig =.013) indicate that religious participation has an effect on physical exam that is dependent on gender. Among males, religious participation is associated with a 35% increased likelihood of having a physical exam compared to males who do participate. Thus, while the gender gap in having a physical examination generally favors females, this effect is attenuated for those who are involved in religious service attendance and religious participation. Across models, education and age are significant positive predictors of physical examination (not shown). There is no significant association between marital status and having a physical exam (not shown).

Table 8C

Interaction Effect between Religiosity and Gender on Physical Exam

(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.039 (1.039)					
Religious Participation [a]		.075 (1.078)				
Prayer [b]			.146 (1.158)			
Meditation [b]				.049 (1.050)		
Religious Scripture [b]					.112 (.070)	
Religious Media [b]						-.013 (.049)
MALE	-1.187*** (.305)	-1.046*** (.351)	-.305 (.737)	-.497* (.608)	-.493 (.611)	-.639** (.528)
RA X Male	.211* (1.235)					
RP X Male		.223* (1.250)				
Pray X Male			-.054 (.947)			
Med X Male				-.019 (.981)		
RS X Male					-.018 (.982)	
RM X Male						.033 (1.034)
Constant	-1.001**	-1.113***	-1.447***	-1.153***	-1.228***	-.979**
Nag R^2	.141	.147	.127	.129	.130	.126
Hosmer and Lemeshow X^2 (significance)	7.764 (.457)	16.301 (.038)	17.397 (.026)	12.880 (.116)	16.641 (.034)	15.618 (.048)
Log likelihood	1701.975	1694.971	1712.084	1674.433	1712.126	1694.781

Standardized data weights used in analysis

Physical exam: Yes = 1, No = 0 — b coefficient (odds ratio)

[a] 1 = Never, 5 = Several times a week

[b] 1 = Never, 5 = Several times a day

***p< 0.001
**p< 0.01
*p< 0.05

Physical Examination–Summary

Do public and private religiosity and sociodemographic measures have an effect on having a general physical examination?

The results provided by basic logistic regressions show that both forms of public religiosity, service attendance and religious participation, are significantly associated with having a physical examination. Thus, an increase in these forms of religiosity is associated with the increased likelihood of having a well-patient examination. Two out of four private religiosity measures, prayer and religious scripture reading, are shown to have a significant positive relationship with having a physical examination. Meditation and religious media use were not significant predictors of having a physical exam. Across all measures, the results of covariates show that being female, educated, and older is associated with having a physical examination. Marital status is not significantly associated with having a physical examination.

Does the effect of public and private religiosity on having a general physical exam differ by race/ethnicity?

Religiosity did not have an impact on health behaviors for Whites. For Blacks, meditation is the only measure that has a positive effect on having a general physical exam. There is a clear pattern that religiosity differentiates Hispanics more so than Blacks and Whites for physical exam. For Hispanics, there is a positive effect of religious attendance, religious participation, prayer, and religious scripture reading on having a physical exam.

Does the effect of public and private religiosity on having a general physical exam differ by gender?

For females, there is no effect on any of the religiosity measures on having a physical exam. Although the results in models 1 and 2 show that women are significantly more likely to

have a physical exam compared to men, there is a positive effect of religious service attendance and religious participation on having a physical exam for males (see table 8C).

Routine Dental Care

Dental health care is not only important for aesthetic reasons, but research has shown that dental health is important to overall health. Poor oral health has been linked to health problems such as heart disease, kidney disease and other digestive and major organ related illnesses (Academy of General Dentistry, 2011). Very little research has been conducted focusing on the association between religiosity and dental routine care. Table 9A presents the results of logistic regression for having a routine dental cleaning or exam in the past 12 months based on religiosity, race/ethnicity, gender, marital status, education and age. Model 1 provides results based on the forced entry analysis of independent variables. The full model shows religious participation as being the only measure that is significantly associated with having regular general dental exams. Based on this positive association, increased levels of participation in activities and organizations of a church or place of worship other than attending services is associated a 21% increase in the likelihood of having a routine dental cleaning or examination in the past year, $p<0.01$. This significant association is sustained in model 3, with religious participation being associated with an 18% increased likelihood of having a regular dental exam ($p<0.001$).

Results from independent religiosity models shows that, in addition to religious participation, religious service attendance (model 2) is associated with an 11% increase in the odds of having a dental exam, and reading religious scripture (model 6) is associated with 12% increase in the odds of having a dental exam, $p<0.05$ for both models. Having a general dental examination was not significantly associated with prayer, meditation, or the use of religious

media. Across all models, Blacks are shown to be significantly less likely to have a general dental exam compared to Whites. There is no significant difference noted between Hispanics and Whites. Being female is associated with a significant increase in the likelihood of having a dental cleaning or exam, $p<0.05$, across models. Marital status and age are not significant predictors of having a regular dental cleaning or exam. However, an increase in the level of education is associated with a 100 - 109% increased likelihood of having a regular dental cleaning or exam.

Overall, religious participation was the only measure that was associated with an increase in the likelihood of having a dental cleaning or exam for both the full and individual models. The significance of this association was moderate in model 1, $p<0.01$, and strong in model 3, $p<0.001$. With independent assessments, increased participation in religious service attendance and reading religious scripture were significantly related to having a routine dental exam or cleaning.

Table 9A

The Effects of Religiosity on Dental Care

(Logistic Regression)

MODEL	1	2	3	4	5	6	7
Religious Attendance [a]	-.040	.104*					
	(.961)	(1.110)					
Religious Participation [a]	.193**		.165***				
	(1.213)		(1.179)				
Prayer [b]	-.016			.039			
	(.984)			(1.040)			
Meditation [b]	-.015				.011		
	(.985)				(1.011)		
Religious Scripture [b]	.064					.113*	
	(1.066)					(1.120)	
Religious Media [b]	-.054						.030
	(.948)						(1.031)
BLACK	-.475*	-.520**	-.516**	-.473*	-.495*	-.514**	-.486*
	(.622)	(.594)	(.597)	(.623)	(.609)	(.598)	(.615)
HISPANIC	.011	-.063	.011	-.043	-.085	-.031	-.040
	(1.011)	(.939)	(1.011)	(.958)	(.919)	(.970)	(.961)
MALE	-.288*	-.276*	-.292*	-.285*	-.267*	-.245*	-.283*
	(.750)	(.759)	(.747)	(.752)	(.766)	(.783)	(.753)
Married/Partnered (1)	.117	.144	.131	.181	.134	.164	.169
	(1.124)	(1.155)	(1.139)	(1.198)	(1.143)	(1.178)	(1.184)
Education	.696***	.729***	.713***	.733***	.725***	.731***	.739***
	(2.005)	(2.073)	(2.041)	(2.081)	(2.065)	(2.078)	(2.094)
Age	-.003	-.005	-.004	-.004	-.007	-.005	-.005
	(.997)	(.995)	(.996)	(.996)	.993	(.995)	(.995)
Constant	-.982**	-1.041***	-1.121***	-.952**	-.661*	-1.062***	-.841**
Nag R^2	.124	.115	.123	.111	.108	.115	.111
Hosmer and Lemeshow X^2	21.581	25.313	26.998	15.086	13.497	14.015	25.265
(significance)	(.006)	(.001)	(.001)	(.058)	(.096)	(.081)	(.001)
Log likelihood	1724	1791	1782	1790	1757	1789	1796

Standardized data weights used in analysis

Dental Exam
Yes = 1
No = 0

b coefficient
(odds ratio)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

***p< 0.001
**p< 0.01
*p< 0.05

Religiosity, Race/Ethnicity and Dental Care

Results for main effects in Table 9B show that religious attendance (b=.146, sig. =.012) and religious participation (b=.152, sig. =.014) are significantly associated with having a regular dental exam. Accordingly, Whites that participate in these activities are different than Whites that do not participate as it relates to having a dental exam. Interaction results for models 1 and 2 suggest that race/ethnicity moderates the effect of attendance and participation on dental care. According to interaction results there is a significant negative effect of religious service attendance (b=-.351, sig. =.021) and religious participation (b=-.390, sig. =.003) on dental care for Blacks. Among Blacks, as religious attendance increases by 1, the odds of having dental care decrease by 19%. Additionally, as religious participation increases by 1, the odds of having dental care decrease by 21%. Overall, the results of model 1 show that the effect of religious service attendance is negative for Blacks and positive for Whites.

In model 2, a significant interaction effect between HISPANIC and religious participation (b=.196, sig= .046), shows that there is a positive effect of religious participation on having dental care for this group. Among Hispanics, a one level increase in religious participation increases the odds of getting a dental exam by 42%. Overall, the results of model 2 shows that there is a positive effect of religious participation for Hispanics and Whites, and a negative effect of religious participation for Blacks, on having dental care.

In model 4, there is no effect of meditation on having dental care for Whites. However, based on the main effect for BLACK, when groups infrequently meditate, Whites are significantly more likely to have dental care. The interaction effect in the model is positive for Blacks (b=.517, sig =.000). These results show that as meditation increase by 1, the odds of getting dental care increase by 53% for Blacks. The significant main effect for HISPANIC

shown in model 6, suggests that Whites are more likely to receive dental care compared to Hispanics, when groups have low levels of media use. However, the significant interaction effect between HISPANIC and religious media use (b=.283, sig. =.004), shows a positive effect of religious media use on having dental care for Hispanics. Among Hispanics, as religious media use increases by 1, the odds of getting dental care increased by 22%. There is no effect of religious media use on getting a physical exam among Whites or Blacks. Across models, a one level increase in education is associated with an increase in the likelihood of having general dental care (not shown). Age and marital status are not significantly associated with having dental care.

Table 9B

Interaction between Religiosity and Race/Ethnicity on Dental Care

(Logistic regression)

Model	1	2	3	4	5	6
Religious Attendance [a]	.146* (1.158)					
Religious Participation [a]		.152* (1.165)				
Prayer [b]			-.038 (.963)			
Meditation [b]				-.092 (.912)		
Religious Scripture [b]					.058 (1.060)	
Religious Media [b]						-.082 (.922)
BLACK	.690 (1.994)	.527 (1.693	-.937 (.392)	-1.915*** (.147)	-.992 (.371)	-.420 (.657)
HISPANIC	.017 (1.017)	-.357 (.700)	-.780 (.458)	-.304 (.738)	-.240 (.787)	-.613* (.542)
RA X Black	-.351* (.704)					
RA X Hispanic	-.027 (.974)					
RP X Black		-.390** (.677)				
RP X Hispanic		.196* (1.217)				
Pray X Black			.117 (1.124)			
Pray X Hispanic			.196 (1.217)			
Med X Black				.517*** (1.677)		
Med X Hispanic				.100 (1.105)		
RS X Black					.169 (1.184)	
RS X Hispanic					.087 (1.091)	
RM X Black						.012 (1.012)
RM X Hispanic						.283** (1.327)
Constant	-1.201***	-1.103***	-.650[ns]	-.450[ns]	-.921**	-.596*
Nag R^2	.120	.139	.114	.121	.116	.118
Hosmer and Lemeshow X^2 (significance)	17.701 (.024)	22.293 (.004)	14.829 (.063)	27.027 (.001)	8.928 (.348)	14.619 (.067)
Log likelihood	1785.707	1763.468	1786.671	1742.691	1787.285	1786.517

Standardized data weights used in analysis

Dental exam: Yes = 1, No = 0 | b coefficient (odds ratio) | [a] 1 = Never, 5 = Several times a week | [b] 1 = Never, 5 = Several times a day | ***p< 0.001, **p< 0.01, *p< 0.05

Religiosity, Gender and Dental Care

Of the six religiosity measures assess, prayer is the only one shown to have a significant effect for both males and females. In model 3, the main effect for prayer (b= .242, sig. =.003) is significant and positive. Thus, this finding suggests that females who pray are different than females who do not pray, in the likelihood of having dental care. The significant main effect for MALE (b= 1.068, sig. =.013) suggests that males are significantly more likely than females to have dental care when these groups infrequently participate in prayer. Significant interactions in this model shows that prayer (b= -.353, sig. =.001) has a negative effect on having dental care for males. Among males, as prayer increase by 1, the odds of getting routine dental care decreases by 89%. Although males are significantly more likely to have dental care when levels of religiosity are one, the difference between males and females is greater among those who have high levels of prayer and it starts to advantage females. For gender, there is no effect of any other religiosity measure on having dental care.

Although religious participation does not have an effect on having dental care for males and females, the significant main effect for males, in model 2, shows that compared to females, males are significantly less likely to have a general dental exam when levels of religious participation equal zero. Across all models, additional covariate analyses show that a one-level increase in education is associated with an increase in the likelihood of having dental care (not shown). Age and marital status are not significantly associated with having a dental exam.

Table 9C

Interaction between Religiosity and Gender on Dental Care
(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.099 (1.104)					
Religious Participation [a]		.094 (1.099)				
Prayer [b]			.242** (1.274)			
Meditation [b]				-.019 (.981)		
Religious Scripture [b]					.115 (1.122)	
Religious Media [b]						.026 (1.027)
MALE	-.310 (.733)	-.602** (.548)	1.068* (2.911)	-.419 (.658)	-.234 (.791)	-.346 (.707)
RA X Male	.011 (1.011)					
RP X Male		.146 (1.157)				
Pray X Male			-.353** (.703)			
Med X Male				.064 (1.066)		
RS X Male					-.004 (.996)	
RM X Male						.038 (1.039)
Constant	-1.024**	-.980**	-1.773***	-.583*	-1.068**	-.710*
Nag R^2	.115	.125	.121	.109	.115	.107
Hosmer and Lemeshow X^2 (significance)	22.726 (.004)	30.485 (.000)	14.576 (.068)	17.638 (.024)	14.604 (.067)	24.576 (.002)
Log likelihood	1791.149	1779.049	1779.020	1755.932	1788.730	1779.591

Standardized data weights used in analysis

Dental exam: Yes = 1, No = 0 | b coefficient (odds ratio) | [a] 1 = Never, 5 = Several times a week | [b] 1 = Never, 5 = Several times a day | ***p< 0.001, **p< 0.01, *p< 0.05

Dental Exam–Summary

Do religiosity and sociodemographic measures have an effect on having routine dental care?

There is a significant positive relationship between religious attendance, religious participation, and reading religious scripture, and having routine dental care (Table 9A). Results of covariate measures consistently show that Blacks and males are significantly less likely to

have routine care. Additionally, an increase in levels of education is associated with having dental care.

Does the effect of religiosity on routine dental care differ by race/ethnicity?

Religious service attendance and religious participation has a positive effect on having dental care for Whites. Although religious service attendance and religious participation is also shown to have significant effect on having dental care for Blacks, the effect is negative. However, meditation has a strong, positive effect on having dental care for Blacks. For Hispanics, religious service attendance and religious media has a positive effect on having dental care. Religious participation is the only religiosity measure that has a significant effect on having dental care for all three racial/ethnic groups.

Does the effect of religiosity on routine dental care differ by gender?

Prayer is the only measure that was shown to have an effect on having dental care for both gender groups. Most interestingly, the effect of prayer was negative for males.

Vitamin Use

Very little research has been conducted analyzing the effects of religiosity on the use of vitamins or dietary supplements. In previous studies where vitamin use was regressed on religiosity, it was assessed as one of several variables used to create an index used as a measurement of healthy lifestyles (Hill et al., 2007) and it was assessed as one of several health behavior variables for which religious service attendance was the sole measure of religiosity (Hill et al., 2006). The present study has expanded the work of previous studies by conducting analyses that describe the individual and interaction effects of religiosity on vitamin use.

In Table 10A, the results provided in model 1 (full model) show that meditation (b=.109, $p>0.05$) and religious scripture (b=.179, $p>0.01$) are related to the increased likelihood of using

vitamins or supplements. Moreover, the individual assessment of religiosity, models 2 through 7, show that all religiosity measures are related to the increased likelihood of vitamin use, with $p<0.001$ for each model. The most effective form of religious involvement is religious scripture reading, which increases the likelihood of using vitamins/supplements by 35%. As the frequency of prayer increases, the likelihood of using vitamins/supplements increases 31%. Other measures increased the likelihood of vitamin use 19-22% (see table 10A). Therefore, participation in religious activities has a substantial effect on regular vitamin and dietary supplement use.

Across all models, Blacks are significantly less likely to use vitamins. This is true for Hispanics in the assessment of the full model and in models 2 and 5. Males are noted as being significantly less likely to use vitamins/supplements. An increase in both, age and education is associated with an increase in vitamin/supplement use. Every one-unit increase in age is associated with a 3% increase in the likelihood of using vitamins or other dietary supplements for health, across all models. A unit increase in education is associated with a 26% to 33% (model based), increased likelihood of vitamin use. Marital status does not have a significant effect on vitamin use.

Table 10A

The Effects of Religiosity on Vitamin Use

(Logistic Regression)

MODEL	1	2	3	4	5	6	7
Religious Attendance [a]	-.032 (.959)	.192*** (1.211)					
Religious Participation [a]	.050 (1.051)		.179*** (1.196)				
Prayer [b]	.117 (1.124)			.268*** (1.307)			
Meditation [b]	.109* (1.115)				.199*** (1.220)		
Religious Scripture [b]	.179** (1.196)					.300*** (1.350)	
Religious Media [b]	.059 (1.061)						.170*** (1.185)
BLACK	-.876*** (.416)	-.656** (.519)	-.614** (.541)	-.678** (.507)	-.707*** (.493)	-.698*** (.498)	-.725*** (484)
HISPANIC	-.296* (.744)	-.282* (.755)	-.190 (.827)	-.249 (.780)	-.365** (.694)	-.207 (.813)	-.226 (.798)
MALE	-.253* (.776)	-.367** (.693)	-.398*** (.672)	-.284* (.753)	-.367** (.693)	-.300* (.741)	-.376** (.687)
Married/Partnered (1)	-.015 (.985)	-.056 (.945)	-.058 (.944)	-.007 (.993)	.007 (1.007)	-.037 (.963)	-.048 (.953)
Education	.269** (1.308)	.251** (1.285)	.233** (1.263)	.271*** (1.311)	.259** (1.296)	.266*** (1.305)	.287*** (1.332)
Age	.028*** (1.029)	.030*** (1.031)	.032*** (1.032)	.029*** (1.029)	.028*** (1.028)	.030*** (1.031)	.029*** (1.030)
Constant	-2.779***	-2.074***	-1.943***	-2.584***	-1.878***	-2.346	-1.907***
Nag R^2	.185	.155	.153	.159	.162	.170	.150
X^2 Hosmer and Lemeshow (significance)	6.694 (.570)	11.331 (.184)	5.474 (.706)	17.096 (.029)	23.471 (.003)	10.194 (.252)	4.646 (.795)
Log likelihood	1697	1790	1792	1779	1740	1768	1794

Standardized data weights used in analysis

Vitamin Use
Yes = 1
No = 0

b coefficient
(odds ratio)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05
**p< 0.01
***p< 0.001

Religiosity, Race/Ethnicity and Vitamin Use

Table 10B presents the results of interaction analyses for religiosity and race/ethnicity. The significant main effects for religious attendance (b=.157, sig. =.006), prayer (b=.212, sig. =.002), meditation (b=.182, sig. =.003), and religious scripture reading (b= .298, sig. =.000) shows that these religiosity measures have an effect on vitamin use for Whites. There were no significant interactions for these models; thus, the aforementioned religiosity measures did not have a significant effect on vitamin use for Blacks and Hispanics.

In model 2, there is a significant interaction for Hispanics. The significant effect of religious participation (b= .252, sig. =.007) suggests that among Hispanics, a one-level increase in religious participation is related to a 40% increase in the odds of regular vitamins or supplement use for health. Religious media also had a significant effect on vitamin use for Hispanics (b= .213, sig. =.029). A one-level increase in using religious media is associated with a 34% increase in the odds of vitamin use for Hispanics.

Results produces by covariate effects show that education and age are strongly associated with an increased likelihood of vitamin use for all models (not shown). The association for marital status was insignificant for all models (not shown).

Table 10B

Interaction Effect between Religiosity and Race/Ethnicity on Vitamin Use

(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.157** (1.170)					
Religious Participation [a]		.083 (1.087)				
Prayer [b]			.212** (1.236)			
Meditation [b]				.182** (1.200)		
Religious Scripture [b]					.298*** (1.347)	
Religious Media [b]						.076 (1.079)
BLACK	-.311 (.733)	-.664 (.515)	-1.558 (.211)	-.572 (.565)	-1.181* (.307)	-.943 (.389)
HISPANIC	-.675 (.509)	-.720 (.487)	-.808 (.446)	-.485 (.616)	-.133 (.876)	-.665** (.514)
RA X Black	-.091 (.913)					
RA X Hispanic	.128 (1.137)					
RP X Black		.033 (1.033)				
RP X Hispanic		.252** (1.286)				
Pray X Black			.208 (1.231)			
Pray X Hispanic			.145 (1.157)			
Med X Black				.155 (1.168)		
Med X Hispanic				.051 (1.053)		
RS X Black					.155 (1.168)	
RS X Hispanic					-.032 (.969)	
RM X Black						.099 (1.104)
RM X Hispanic						.213* (1.238)
Constant	-1.992***	-1.720***	-2.355***	-1.849***	-2.330***	-1.703***
Nag R^2	.157	.159	.160	.162	.171	.154
Hosmer and Lemeshow X^2 (significance)	20.010 (.010)	13.124 (.108)	22.259 (.004)	13.648 (.091)	14.842 (.062)	5.814 (.668)
Log likelihood	1787.054	1784.197	1777.272	1739.354	1766.389	1789.180

Standardized data weights used in analysis

Vitamin Use: Yes = 1, No = 0 — b coefficient (odds ratio)

[a] 1 = Never, 5 = Several times a week

[b] 1 = Never, 5 = Several times a day

***p< 0.001
**p< 0.01
*p< 0.05

Religiosity, Gender and Vitamin Use

All measures of religiosity are shown to have a positive effect on the regular use of vitamins or other dietary supplement s for health for females (see Table 10C). This suggests that females who participate in religious activities are different than females who do not participate in religious activities in their use of vitamins or supplements. Main effects for MALE, in models 2 and 6, show that females are significantly more likely to use vitamins/supplements compared to males, when levels of religious participation (b= -.434, sig. =.047) and religious media (b= -.779, sig. =.000) use equals zero.

Religious media (model 6) is the only religiosity measure that is shown to have a significant effect for both males and females. The interaction results show a positive effect of religious media on vitamin use for males (b=.178, sig. =.004). For males, a one-unit increase in using religious media increases the odds of vitamin use by 38%. Although the gender gap in vitamin use tends to favor females, the difference between men and women is smaller among those that have high levels of religious media use. Results not presented show that for all models, increasing education and age are significantly associated with an increased likelihood of vitamin use. Also, there is no significant finding for marital status.

Table 10C

Interaction between Religiosity and Gender on Vitamin Use

(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.225*** (1.252)					
Religious Participation [a]		.171** (1.186)				
Prayer [b]			.383*** (1.466)			
Meditation [b]				.183** (1.201)		
Religious Scripture [b]					.293*** (1.341)	
Religious Media [b]						.147** (1.159)
MALE	-.153 (.858)	-.434* (.648)	.476 (1.610)	-.444 (.641)	-.337 (.714)	-.779*** (.459)
RA X Male	-.069 (.933)					
RP X Male		.017 (1.017)				
Pray X Male			-.196 (.822)			
Med X Male				.033 (1.033)		
RS X Male					.015 (1.015)	
RM X Male						.178** (1.195)
Constant	-2.179***	-1.926***	-3.045***	-1.840***	-2.328***	-1.710***
Nag R^2	.155	.153	.161	.162	.170	.156
Hosmer and Lemeshow X^2 (significance)	14.629 (.067)	5.996 (.648)	32.655 (.000)	22.992 (.003)	7.341 (.500)	2.183 (.975)
Log likelihood	1789.068	1791.917	1776.132	1739.778	1767.579	1768.054

Standardized data weights used in analysis

Vitamin Use: Yes = 1, No = 0 — b coefficient (odds ratio)

[a] 1 = Never, 5 = Several times a week

[b] 1 = Never, 5 = Several times a day

***p< 0.001
**p< 0.01
*p< 0.05

Vitamin/Supplement Use– Summary

Do religiosity and sociodemographic measures have an effect on the regular use of vitamins or supplements?

Of the three preventive health measures assessed in this chapter, vitamin use is the only health behavior that has strong positive association with all six religiosity measures (Table 10A). The results show that increased participation in religious attendance, religious participation,

prayer, meditation, reading religious scripture, and using religious media, are associated the increased likelihood of regular use of vitamins or other dietary supplements for health. Covariate results consistently show that being Black and male are associated with a decreased likelihood of vitamin use, and an increase in education and age are associated with an increase in regular vitamin use.

Does the effect of religiosity on the use of vitamins or supplements differ by race/ethnicity?

Religious service attendance, prayer, meditation, and religious scripture reading have a significant positive effect on vitamin use for Whites. None of the religiosity measures have an effect on vitamin use for Blacks. For Hispanics, religious participation and religious media has a significant positive effect on vitamin use.

Does the effect of religiosity on the use of vitamins or supplements differ by gender?

All measures of religiosity were shown to have a significant positive effect on vitamin use for females. Religious media also has an effect on vitamin use for males. The effect of religious media was stronger for males than for females.

CHAPTER 5

Religiosity and Abstention

The use of tobacco and excessive alcohol consumption are noted as causes of chronic illnesses which lead to premature preventable death (CDC.gov). Studies have shown that some aspects of religion are associated with levels of smoking and alcohol consumption. Religious service attendance is noted as being inversely related to with these health behaviors. Thus, increased levels of religious service attendance are associated with decreased levels of participation or abstention from these life threatening behaviors (Wasserman and Trovato, 1996; Garcia, et al, 2013). This study will serve to contribute to existing literature by assessing the effects of several measures of religiosity; attendance, religious participation, prayer, meditation, reading religious scripture, and using religious media, on smoking and drinking abstention. Moreover, gender and racial/ethnic differences will be described.

Logistic regression was used to assess the effect of religiosity on smoking and alcohol abstention. Since abstention was the outcome of interest, the data were coded so that non-participation or abstinence equals 1, and use or participation equals 0. The measure for alcohol use was recoded so that abstinence is operationalized as the consumption of 12 or fewer alcoholic beverages. These responses were coded 1, the response of interest. Responses indicating consumption of 12 or more alcohol drinks in the past 12 months were coded 0. All other variables are measured in the same manner as those in the previous chapter.

Alcohol Abstention

Results of the independent models shown in table 11A suggest that all measures of religiosity are significantly associated with non-participation in alcohol use, suggesting that increased levels of participation in religious activity is associated with alcohol abstinence. Each

religiosity measure has a $p<0.001$, with the exception of religious participation where $p<0.01$ (see models 2-7). The analyses of covariates for these models show that Blacks have an increased likelihood (66% - 106%) of abstaining from alcohol use. There is no significant difference between Hispanics and non-Hispanics. Across all models, males are significantly less likely to abstain when compared to females. There is no significant difference between those who are married/partnered and others. Across all models, education is negatively associated with alcohol abstention ($p< 0.001$). Thus, those with higher levels of education are more likely to have had at least 12 alcoholic drinks in the past 12 months. An increase in age is associated with the increased likelihood of abstention, with $p< 0.001$ across models.

Table 11A

The Effects of Religiosity on Alcohol Abstention

(Logistic Regression)

MODEL	1	2	3	4	5	6	7
Religious Attendance [a]	.108 (1.114)	.197*** (1.218)					
Religious Participation [a]	-.051 (.951)		.145** (1.156)				
Prayer [b]	-.020 (.980)			.205*** (1.227)			
Meditation [b]	.123** (1.131)				.197*** (1.218)		
Religious Scripture [b]	.130* (1.139)					.278*** (1.321)	
Religious Media [b]	.176** (1.192)						.249*** (1.283)
BLACK (1)	.362 (1.435)	.670** (1.954)	.722*** (2.058)	.664** (1.942)	.600** (1.823)	.654** (1.923)	.509** (1.663)
HISPANIC (1)	-.095 (.909)	-.022 (.978)	.063 (1.065)	-.001 (.999)	-.101 (.904)	.053 (1.054)	.042 (1.042)
MALE (1)	-.721*** (.486)	-.737*** (.479)	-.764*** (.466)	-.669*** (.512)	-.782*** (.458)	-.694*** (.499)	-.734*** (.480)
Married/Partnered (1)	.127 (1.136)	.111 (1.118)	.117 (1.124)	.148 (1.159)	.177 (1.193)	.142 (1.153)	.100 (1.105)
Education	-.347*** (.707)	-.350*** (.705)	-.356*** (.701)	-.334*** (.716)	-.349*** (.706)	-.349*** (.705)	-.311*** (.733)
Age	.016*** (1.016)	.022*** (1.022)	.024*** (1.024)	.021*** (1.021)	.018*** (1.018)	.023*** (1.023)	.021*** (1.021)
Constant	-.673*	-.421[ns]	-.222[ns]	-.637*	-.085[ns]	-.593*	-.389[ns]
Nag R^2	.170	.140	.132	.132	.142	.152	.148
X^2 Hosmer and Lemeshow (significance)	19.694 (.012)	17.308 (.027)	15.776 (.046)	4.753 (.784)	6.702 (.569)	13.494 (.096)	3.844 (.871)
Log likelihood	1711	17.308	1811	1806	1758	1784	1791

Standardized data weights used in analysis

Non-drinker = 1
Drinker = 0

b coefficient
(odds ratio)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05
**p< 0.01
***p< 0.001

Religiosity, Race/Ethnicity and Alcohol Abstention

Based on the analyses, all measures of religiosity have an effect on alcohol abstinence for Whites. Hence, Whites that participate in religious activities are different from Whites that do not participate in religious activities, in abstaining from alcohol drinking. Models 2 through 6, show significant main effects for the variable BLACK as it relates to religious participation (b= .164, sig. =.006), prayer (b=.234, sig. =.001), meditation (b=.240, sig. =.000), religious scripture (b=.338, sig. =.000), and religious media (b=.216, sig. =.001). For these models, Blacks are significantly more likely to abstain from alcohol compared to Whites when the level of religious activity is zero.

Only two interaction terms were shown to be significant. The interaction between Black and prayer (b=-.636, sig. =.009) and Black and meditation (b=-.355, sig. =.013) suggests that there is a significant negative effect of these forms of religiosity on abstaining from alcohol for Blacks. Among Blacks, a one-unit increase in prayer decreases the odd of alcohol abstinence by 33%. Moreover, every one-unit increase in meditation decreases the odd of alcohol abstinence by 11%. Education and age are significantly associated with alcohol abstention. However, with education there is negative association, and with age there is a positive association. Thus, an increase in education is associated with a decreased likelihood of abstention and an increase in age is associated with an increase in the likelihood of abstention (not shown). There is no significant association between marital status and alcohol abstention (not shown).

Table 11B

Interaction Effect between Religiosity and Race/Ethnicity on Alcohol Abstention

(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.191** (1.211)					
Religious Participation [a]		.164** (1.179)				
Prayer [b]			.234** (1.264)			
Meditation [b]				.240*** (1.271)		
Religious Scripture [b]					.338*** (1.402)	
Religious Media [b]						.216** (1.241)
BLACK	.920 (.569)	1.124** (3.078)	3.398** (29.911)	1.599*** (4.948)	1.505** (4.502)	.036 (1.037)
HISPANIC	-.126 (.308)	.069 (1.071)	-.031 (.969)	-.089 (.915)	.226 (1.254)	-.033 (.967)
RA X Black	-.072 (.931)					
RA X Hispanic	.034 (1.035)					
RP X Black		-.153 (.858)				
RP X Hispanic		-.001 (.999)				
Pray X Black			-.636** (.529)			
Pray X Hispanic			.011 (1.012)			
Med X Black				-.355* (.701)		
Med X Hispanic				-.009 (.992)		
RS X Black					-.299 (.741)	
RS X Hispanic					-.071 (.932)	
RM X Black						.168 (1.183)
RM X Hispanic						.037 (1.038)
Constant	-.412[ns]	-.262[ns]	-.782*	-.172[ns]	-.752*	-.324[ns]
Nag R^2	.141	.133	.139	.148	.155	.149
Hosmer and Lemeshow X^2 (significance)	15.914 (.044)	6.555 (.585)	12.063 (.148)	6.265 (.618)	10.257 (.247)	5.833 (.666)
Log likelihood	1801.164	1810.095	1798.461	1751.454	1781.129	1790.140

Standardized data weights used in analysis

Non-drinker = 1
Drinker = 0

b coefficient (odds ratio)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

***p< 0.001
**p< 0.01
*p< 0.05

Religiosity, Gender and Alcohol Abstention

Significant main effects for various religiosity measures show an effect for females. In models 1 and 4, religious service attendance (b= .208, sig. =.001) and meditation (b= .152, sig. =.009), show no effect for males (Table 11C). Religious scripture (b= .162, sig. =.015), and religious media (b= .236, sig. =.000) have a significant effect on alcohol abstinence for females, as well as males (b= .241, sig. =.0; b= .187, sig. =.000, respectively). Results for all models show that females are significantly more likely to abstain from alcohol use when the level of religious activity is zero. Although the gender gap in abstaining from alcohol tends to favor females, this effect is attenuated for those that are very involved in religious scripture reading and religious media use. For males, each level increase in religious scripture reading increases the probability of alcohol abstinence by 50%, and as religious media use increases by one-unit, the odds of abstinence increase by 53%.

The strong negative effect for MALE (b= -1.973, sig. =.000) suggests that females are significantly more likely than males to abstain from alcohol use when level of prayer is zero. The gender difference becomes smaller among those who have high levels of prayer. Among males there is a 43% increased likelihood of alcohol abstinence for every one-unit increase in the frequency of prayer.

Education and age are significantly associated with alcohol abstention. However, with education there is negative association and with age there is a positive association. Thus, an increase in education is associated with a decreased likelihood of abstention and an increase in age is associated with an increase in the likelihood of abstention (not shown). There is no significant association between marital status and alcohol abstention.

Table 11C

Interaction Effect between Religiosity and Gender on Alcohol Abstention

(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.208** (1.231)					
Religious Participation [a]		.093 (1.097)				
Prayer [b]			.017 (1.017)			
Meditation [b]				.152** (1.164)		
Religious Scripture [b]					.162* (1.176)	
Religious Media [b]						.236*** (1.266)
MALE	-.670* (.512)	-.993*** (.371)	-1.973*** (.139)	-.996*** (.369)	-1.284*** (.277)	-1.188*** (.305)
RA X Male	-.022 (.978)					
RP X Male		.104 (1.110)				
Pray X Male			.339** (1.404)			
Med X Male				.092 (1.096)		
RS X Male					.241* (1.273)	
RM X Male						.187** (1.206)
Constant	-.454[ns]	-.112[ns]	.114[ns]	.026[ns]	-.297[ns]	-.223[ns]
Nag R^2	.140	.133	.140	.143	.158	.161
Hosmer and Lemeshow X^2 (significance)	12.607 (.126)	10.778 (.215)	10.419 (.237)	10.563 (.228)	14.924 (.061)	14.164 (.078)
Log likelihood	1801.544	1809.941	1796.196	1756.959	1778.181	1756.264

Standardized data weights used in analysis

Non-drinker = 1
Drinker = 0

b coefficient (odds ratio)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

***p< 0.001
**p< 0.01
*p< 0.05

Alcohol Abstention–Summary

Do religiosity and sociodemographic measures have an effect on alcohol abstinence?

All assessed measures of religiosity were shown to be positively associated with alcohol abstinence. Thus, an increase in religious activity is associated with an increased likelihood of abstaining from alcohol use. For each model in which religiosity variables were independently assessed, the results for covariates suggests that Blacks, females, decreased levels of education, and increased levels of age, are associated with abstaining from alcohol (see table 11A).

Does the effect of religiosity on alcohol abstinence differ by race/ethnicity?

All measures of religiosity have a positive effect on alcohol abstinence for Whites. Among Blacks, only prayer and meditation were shown to have an effect on alcohol abstinence, and these effects were negative. None of the religiosity measures had an effect on alcohol abstinence for Hispanics.

Does the effect of religiosity on alcohol abstinence differ by gender?

Religious service attendance, meditation, religious scripture, and religious media, were all shown to have an effect on alcohol abstinence for females. For males, prayer, religious scripture, and religious media have an effect on alcohol abstinence. The effect of religious scripture was stronger for males and the effect of religious media was stronger for females.

Smoking Abstention

In the original dataset smoking was assessed with the question "Are you a current smoker, a former smoker or have you never smoked?" For this analysis, this variable was recoded so that those who are former smokers and those who have never smoked are grouped as non-smokers and coded 1; current smokers are coded 0. In both, the full (model 1) and independent (model 2) models, there is a strong, significant, positive relationship between

service attendance and not smoking, $p<0.001$. In the independent assessment of religiosity, religious participation and reading religious scripture become strong positive predictors of non-smoking behavior.

In models 1 through 7, the results show that Hispanics are significantly less likely to smoke compared to Whites. Based on these findings, for every one unit increase in race, the odds of not smoking increase among Hispanics by 136% to 177%, depending on the model, with a consistent strength of $p<0.001$. Being female and having higher levels of education is significantly related to an increased likelihood of not smoking, $p<0.001$, across models. Smoking behavior was the only health behavior that has been significantly influenced by marital status. Although marital status did not consistently contribute to smoking behavior, being married/partnered was a significant predictor of not smoking in the model for religious participation, prayer, meditation, religious scripture, and religious media, all with $p<0.05$. Education was a significant positive predictor of smoking abstention, for all models. Age was also a positive predictor, although its impact was inconsistent. The significant positive relationship between age and smoking was found in the models for religious participation, religious scripture, and religious media. Thus, with these models, an increase in age was related to an increase in the likelihood of not smoking.

Table 12A

The Effects of Religiosity on Smoking Abstention

(Logistic Regression)

MODEL	1	2	3	4	5	6	7
Religious Attendance [a]	.373*** (1.452)	.363*** (1.438)					
Religious Participation [a]	-.016 (.984)		.228*** (1.256)				
Prayer [b]	-.077 (.926)			.114 (1.121)			
Meditation [b]	.022 (1.022)				.083 (1.087)		
Religious Scripture [b]	.067 (1.069)					.245*** (1.277)	
Religious Media [b]	-.074 (.928)						.066 (1.069)
Black (1)	-.203 (.817)	-.329 (.720)	-.156 (.856)	-.132 (.875)	-.141 (.869)	-.193 (.825)	-.149 (.862)
Hispanic (1)	.886*** (2.424)	.860*** (2.364)	1.021*** (2.777)	.934*** (2.544)	.908*** (2.480)	.966*** (2.627)	.940*** (2.560)
Male (1)	-.644*** (.525)	-.632*** (.531)	-.680*** (.506)	-.616*** (.540)	-.633*** (.531)	-.589*** (.555)	-.653*** (.521)
Married/Partnered (1)	.275 (1.317)	.250 (1.284)	.279* (1.321)	.327* (1.387)	.325* (1.383)	.331* (1.393)	.313* (1.368)
Education	.779*** (2.180)	.812*** (2.252)	.803*** (2.231)	.821*** (2.273)	.790*** (2.204)	.812*** (2.252)	.829*** (2.292)
Age	.009 (1.009)	.008 (1.008)	.011** (1.011)	.008 (1.008)	.008 (1.008)	.008* (1.009)	.008* (1.008)
Constant	-1.605***	-1.827***	-1.411***	-1.329***	-1.001**	-1.511***	-1.045**
Nag R^2	.174	.179	.149	.133	.125	.147	.130
X^2 Hosmer and Lemeshow (significance)	9.013 (.341)	4.722 (787)	10.586 (.226)	11.671 (.166)	16.829 (.032)	4.749 (.784)	33.532 (.000)
Log likelihood	1330	1371	1401	1417	1386	1403	1421

Standardized data weights used in analysis

Non-smoker = 1
Smoker = 0

b coefficient
(odds ratio)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

***p< 0.001
**p< 0.01
*p< 0.05

Religiosity, Race/Ethnicity and Smoking Abstention

Table 12B shows that the main effects in models 1, 3, and 5, are significant in showing that religiosity had an effect on smoking abstinence for Whites. Among this group, those who attend religious services (b=.414, sig. =.000), take part in religious activities other than attending services (b=.247, sig. =.001), and read religious scripture (b=.187, sig. =.019) are different from Whites who do not practice these activities in terms of smoking abstention.

The main effects for HISPANIC in models 1, 2, 4, and 6, suggest that the group is significantly more likely to abstain from smoking compared to Whites, when the level of religious attendance, religious participation, and religious scripture reading equals zero. However, there is no significant effect of any religiosity measure on smoking abstinence for Hispanics. Additionally, there is no effect of religiosity on smoking abstinence for Blacks. For Blacks and Hispanics, the level of religious participation is not associated with the likelihood of being a smoker or non-smoker.

In models 2, 3, 5, and 6, an increase in age is associated with the increased likelihood of smoking abstinence. In models 2 through 6, being married or partnered is associated with the increased likelihood of smoking abstention. Across models, education is positively associated with an increase in the likelihood of smoking abstinence.

Table 12B

Interaction between Religiosity and Race/Ethnicity on Smoking Abstention

(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.414*** (1.512)					
Religious Participation [a]		.247** (1.280)				
Prayer [b]			.134 (1.143)			
Meditation [b]				.075 (1.078)		
Religious Scripture [b]					.187* (1.205)	
Religious Media [b]						.091 (1.095)
BLACK	.593 (1.809)	-.092 (.912)	1.224 (3.400)	-.040 (.961)	.214 (1.239)	-.240 (.787)
HISPANIC	1.002** (2.724)	1.113*** (3.044)	.915 (2.496)	.834** (2.302)	.502 (1.652)	1.094*** (2.986)
RA X Black	-.283 (.753)					
RA X Hispanic	-.054 (.947)					
RP X Black		-.028 (.972)				
RP X Hispanic		-.049 (.952)				
Pray X Black			-.319 (.727)			
Pray X Hispanic			.009 (1.009)			
Med X Black				-.035 (.966)		
Med X Hispanic				.034 (1.035)		
RS X Black					-.128 (.880)	
RS X Hispanic					.223 (1.249)	
RM X Black						.022 (1.023)
RM X Hispanic						-.078 (.925)
Constant	-1.987***	-1.456***	-1.440**	-.988**	-1.407***	-1.099**
Nag R^2	.182	.149	.135	.125	.152	.131
Hosmer and Lemeshow X^2 (significance)	7.333 (.501)	11.364 (.182)	6.732 (.566)	8.890 (.352)	8.605 (.377)	31.833 (.000)
Log likelihood	1367.670	1400.944	1414.796	1386.124	1397.988	1420.564

Standardized data weights used in analysis

Non-smoker = 1 b coefficient [a] 1 = Never [b] 1 = Never ***p< 0.001

Smoker = 0 (odds ratio) 5 = Several times a week 5 = Several times a day **p< 0.01

*p< 0.05

Religiosity, Gender and Smoking Abstention

The results of main effects shown in table 12C suggests that females who engage in religious services (b= .574, sig. =.000), religious participation (b= .383, sig. =.000), prayer (b= .216, sig. =.023), and religious scripture reading (b= .253, sig. =.002) are significantly more likely to abstain from smoking compared to females who do not participate in these forms of religious activities. Interaction effects in models 1 and 2 are negative. The results in model 1 show that every one-unit increase in service attendance decreases the likelihood of smoking abstinence by 21% for males. Each unit increase in religious participation is associated with a 13% decreased chance of males being non-smokers. Thus, increased activity religious service and religious participation widens the gender gap on smoking abstention for males and females.

The results of all models show that high levels of education and being married or partnered are associated with smoking abstention. Models for religious participation and religious scripture reading show that older age is associated with smoking abstention.

Table 12C

Interaction between Religiosity and Gender on Smoking Abstention

(Logistic regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.574*** (1.775)					
Religious Participation [a]		.383*** (1.467)				
Prayer [b]			.216* (1.242)			
Meditation [b]				.135 (1.145)		
Religious Scripture [b]					.253** (1.288)	
Religious Media [b]						.061 (1.063)
MALE	.420 (1.523)	-.162 (.850)	.011 (1.011)	-.408 (.665)	-.554 (.575)	-.687** (.503)
RA X Male	-.384*** (.681)					
RP X Male		-.264* (.768)				
Pray X Male			-.165 (.848)			
Med X Male				-.099 (.906)		
RS X Male					-.015 (.985)	
RM X Male						.021 (1.021)
Constant	-2.392***	-1.699	-1.735***	-1.131**	-1.531***	-.937**
Nag R^2	.192	.154	.135	.126	.147	.122
Hosmer and Lemeshow X^2	7.901	16.055	15.873	7.886	3.835	37.946
(significance)	(.192)	(.042)	(.044)	(.445)	(.872)	(.000)
Log likelihood	1356.644	1395.209	1414.946	1385.295	1402.668	1403.212

Standardized data weights used in analysis

Non-smoker = 1, Smoker = 0 | b coefficient (odds ratio) | [a] 1 = Never, 5 = Several times a week | [b] 1 = Never, 5 = Several times a day | ***p< 0.001 **p< 0.01 *p< 0.05

Smoking Abstention–Summary

Do religiosity and sociodemographic measures have an effect on smoking abstinence?

Religious service attendance, religious participation, and reading religious scripture, are shown to have a strong (p<.001) effect on smoking abstinence. An increase in participation in the aforementioned forms of religiosity is associated with the increased likelihood of abstaining

from smoking. Hispanics were significantly more likely to abstain from smoking compared to Whites. Females and those with higher levels of education are more likely to abstain from smoking. Marital status and age are inconsistent predictors of smoking abstention.

Does the effect of religiosity on smoking abstinence differ by race/ethnicity?

Religious attendance, religious participation, and religious scripture reading have an effect on smoking abstention for Whites. None of the religiosity measures had a significant effect on smoking behavior for Blacks and Hispanics.

Does the effect of religiosity on smoking abstinence differ by gender?

Religious service attendance, religious participation, prayer, and religious scripture reading, have a positive effect on smoking behavior for females. The significant effect of religious attendance and religious participation was negative for males.

CHAPTER 6

Religiosity and Physical Activity

OLS regression was used to assess the net effect of religiosity on three measures of physical activity. Weekly participation in walking, moderate exercise and strenuous exercise was assessed using a scale of 0 to 7, which represents the number of days respondents participated in any specific activity during a typical week. Seven independent models were constructed. Model 1 of each table provides a full-model of consisting of all religiosity measures and covariates used in the analysis. Models 2 through 7 were used to establish the relationship for individual measures of religiosity, along with covariates.

Walking Activity

Table 14 displays the results obtained from OLS analyses that were conducted for the full model and individual models examining the net effect of religiosity on walking activity. This activity is described as walking to work, for exercise or for pleasure. The results of the full model (Model 1) show that religious participation ($b=.166$, $p<0.05$) is the only measure that is significantly associated with walking activity. This effect is maintained and strengthened in model 3, where religious participation ($b=.060$, $p<0.001$) is assessed as the sole religiosity measures in the model. Thus, an increase in participation in activities and organizations of a church or place of worship other than attending services is associated with an increase in walking activity.

The individual assessment of religiosity measures also shows that religious service attendance ($b=.170$, $p<0.01$), prayer ($b=.058$, $p<0.01$), meditation ($b=.032$, $p<0.05$), and religious scripture ($b=.080$, $p<0.001$) are significant positive determinants of walking activity. Of the six religiosity measures, religious media is the only measure that is not significantly associated with

walking activity. Across all models, 2 through 7, Blacks are significantly more likely participate in walking activity. The results of covariates show that significant negative relationship between age and walking activity is consistent; as age increases walking activity decreases. Education was only significant in the individual model assessment for religious participation, prayer, meditation, religious scripture, and religious media. This positive association suggests that an increase in education is associated with an increase in walking activity. Education did not have a significant effect in the model for religious service attendance. Marital status and gender were not significant predictors of walking activity.

Table 13A

The Effects of Religiosity on Walking Activity
(OLS Regression)

MODEL	1	2	3	4	5	6	7
Religious Attendance [a]	.049	.170**					
	(.075)	(.053)					
Religious Participation [a]	.166*		.060***				
	(.070)		(.016)				
Prayer [b]	.009			.058**			
	(.077)			(.020)			
Meditation [b]	.025				.032*		
	(.055)				(.016)		
Religious Scripture [b]	.139					.080***	
	(.077)					.018)	
Religious Media [b]	-.107						.027
	(.065)						(.017)
Black (1)	.597*	.602*	.194**	.189**	.172*	.178*	.189*
	(.245)	(.235)	(.072)	(.072)	(.073)	(.072)	(.074)
Hispanic (1)	.015	-.049	.032	.015	-.007	.024	.017
	(.172)	(.165)	(.051)	(.050)	(.052)	(.050)	(.051)
Male (1)	.107	.057	-.023	.005	-.009	.004	-.018
	(.145)	(.140)	(.043)	(.044)	(.043)	(.043)	(.043)
Married/Partnered (1)	-.169	-.109	-.015	-.002	-.022	-.005	-.005
	(.247)	(.143)	(.044)	(.044)	(.044)	(.044)	(.044)
Education	.072	.108	.056*	.069*	.061*	.064*	.070*
	(.092)	(.090)	(.028)	(.028)	(.028)	(.027)	(.028)
Age	-.011*	-.009*	-.004**	-.005***	-.005***	-.004**	-.004**
	(.005)	(.004)	(.001)	(.001)	(.001)	(.001)	(.001)
Constant	2.555	2.640***	1.017***	.932***	1.142***	.942***	1.083***
Adjusted R^2	.026	.016	.024	.021	.018	.029	.016
F	4.102	4.262	5.965	5.415	4.593	6.978	4.235
Significance	.000	.000	.000	.000	.000	.000	.000

Standardized data weights used in analysis
b coefficient
(std. error)
[a] 1 = Never
5 = Several times a week
[b] 1 = Never
5 = Several times a day
*p< 0.05 **p< 0.01 ***p< 0.001

Religiosity, Race/Ethnicity and Walking Activity

The main effects for religiosity show that religious attendance (b= .141, sig. =.042), religious participation (b= .168, sig. =.020), and religious scripture reading (b= .199, sig. =.016), are significant for Whites. As it relates to participation in these forms of religiosity, there is a difference between Whites who participate and those who do not when it comes to walking activity. Additionally, Whites are significantly more likely to participate in walking activity compared to Blacks when the level of religious scripture reading is zero (see model 5). Religiosity does not have a significant effect on walking activity for Blacks. Religious media is the only religious measure that has an effect on walking activity for Hispanics.

Age is the only covariate that has a significant negative relationship with walking activity (not shown). The significant effect of age is not found in model 2. Overall, three of six religiosity measures have a significant effect on walking activity for Whites and one measure of religiosity has a significant effect on walking activity for Hispanics. No other effects were found to be significant.

Table 13B

Interaction Effects between Religiosity and Race/Ethnicity on Walking Activity

(OLS regression)

Model	1	2	3	4	5	6
Religious Attendance [a]	.141* (.069)					
Religious Participation [a]		.168* (.072)				
Prayer [b]			.129 (.082)			
Meditation [b]				.095 (.074)		
Religious Scripture [b]					.199* (.082)	
Religious Media [b]						-.092 (.079)
BLACK	-.270 (.685)	-.429 (.479)	-1.364 (1.142)	-.419 (.521)	-1.290* (.610)	-.430 (.580)
HISPANIC	.222 (.379)	.147 (.289)	.264 (.536)	.046 (.297)	.250 (.335)	.519 (.296)
RA X Black	-.099 (.186)					
RA X Hispanic	-.058 (.113)					
RP X Black		.079 (.161)				
RP X Hispanic		.094 (.113)				
Pray X Black			-.166 (.269)			
Pray X Hispanic			.069 (.135)			
Med X Black				.055 (.166)		
Med X Hispanic				-.011 (.107)		
RS X Black					-.227 (.194)	
RS X Hispanic					.116 (.122)	
RM X Black						.118 (.180)
RM X Hispanic						.252* (.121)
Constant	2.821[ns]	3.311**	4.816[ns]	3.813**	4.639**	3.082*
Adjusted R^2	.015	.019	.013	.010	.02	.010
F	3.360***	4.075***	2.997**	2.625**	4.163***	2.618**
df	9	9	9	9	9	9

Standardized data weights used in analysis

b coefficient
(std. error)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05 **p< 0.01 ***p< 0.001

Religiosity, Gender and Walking Activity

Several measures of religiosity are shown to have an effect on walking activity for females. Consequently, women who participate in religious service attendance (b= .170, sig. =.019), religious participation (b=.218, sig. =.002), prayer (b= .207, sig. =038), and religious scripture reading (b= .281, sig. =000) are different from women who do not participate when it comes to walking activity. There are no significant effects of religiosity on walking activity for males. Thus, there is no significant difference between males who are religiously active and those who are not in walking activity.

Age is the only covariate shown to be significantly related to walking activity. Every one-unit increase in age is associated with a decrease in walking activity for religious service attendance, prayer, meditation, and religious scripture (not shown).

Table 13C

Interaction Effects between Religiosity and Gender on Walking Activity
(OLS Regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.170* (.072)					
Religious Participation [a]		.218** (.072)				
Prayer [b]			.207* (.099)			
Meditation [b]				.131 (.069)		
Religious Scripture [b]					.281*** (.079)	
Religious Media [b]						.015 (.058)
MALE	.056 (.350)	.057 (.265)	.530 (.520)	.226 (.276)	.418 (.318)	-.048 (.226)
RA X Male	.000 (.104)					
RP X Male		-.014 (.103)				
Pray X Male			-.112 (.130)			
Med X Male				-.072 (.099)		
RS X Male					-.130 (.116)	
RM X Male						.045 (.075)
Constant	3.747***	3.987***	3.598***	4.003***	3.633***	4.345***
Adjusted R^2	.015	.019	.013	.011	.019	.008
F	3.726***	4.492***	3.365**	3.003**	4.447***	2.339*
df	8	8	8	8	8	8

Standardized data weights used in analysis

b coefficient
(std. error)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05 **p< 0.01 ***p< 0.001

Walking Activity – Summary

Do religiosity and sociodemographic measures have an effect on walking activity?

All religiosity measures were shown to be significantly associated with walking activity, with the exception of religious media. For these analyses, increased levels of religious participation are associated with increased levels of walking activity. Blacks were significantly more likely to walk compared to Whites. An increase in the level of education is associated with increased levels of walking and an increase in age is associated with a decrease in walking activity.

Does the effect of religiosity on walking activity differ by race/ethnicity?

Religious service attendance, religious participation, and religious scripture reading, have an effect on walking activity for Whites. Religiosity does not have an effect on walking activity for Blacks. For Hispanics, religious media is the only measure that has an effect on walking activity.

Does the effect of religiosity on walking activity differ by gender?

For females, religious attendance, religious participation, prayer, and religious scripture reading have an effect on walking activity. There is no effect of religiosity on walking activity for males. Males who participate and males who do not are not significantly different in their levels of walking activity.

Moderate Exercise

Moderate exercise is defined as activities such as: playing golf, bowling, dancing, and yard work, but not including walking. In assessing the effects of religiosity on moderate exercise, the results provided in Table 14A show significant results for several models. In the full model, religious participation (b= .136, sig. =.021) is the only religious measure that is

associated with an increased likelihood of performing moderate exercise. In models that contain the individual analysis of religiosity measures, religious participation (b=.052, sig. =.000) is shown to have strong positive association with the use of moderate exercise. Additionally, religious service attendance (b=.039, sig. =.000) is also strongly associated with the use of moderate exercise. Thus, two measures of religiosity, religious service attendance and religious participation, are associated with the increased likelihood of participating in moderate exercise.

The results of additional covariates show that across models, Hispanics are significantly less likely to participate in moderate exercise compared to Whites, males are significantly more likely to participate in moderate exercise compared to females, and an increase in age is significantly associated with the decreased likelihood of performing moderate exercise. There was no significant difference between Blacks and Whites in the use of moderate exercise. More so, marital status and education were not significantly associated with the use moderate exercise.

Table 14A

The Effects of Religiosity on Moderate Exercise

(OLS Regression)

MODEL	1	2	3	4	5	6	7
Religious Attendance [a]	.070	.039***					
	(.063)	(.014)					
Religious Participation [a]	.136*		.052***				
	(.059)		(.014)				
Prayer [b]	-.057			.001			
	(.065)			(.017)			
Meditation [b]	.088				.026		
	(.046)				(.013)		
Religious Scripture [b]	-.045					.025	
	(.065)					(.015)	
Religious Media [b]	-.072						.017
	(.054)						(.015)
Black (1)	-.192	-.057	-.054	-.036	-.048	-.048	-.053
	(.207)	(.062)	(.061)	(.062)	(.062)	(.062)	(.063)
Hispanic (1)	-.510***	-.152***	-.132**	-.148**	-.129**	-.145**	-.146**
	(.144)	(.043)	(.043)	(.043)	(.044)	(.043)	(.043)
Male (1)	.355**	.140***	.135***	.135***	.133***	.145***	.138*
	(.122)	(.036)	(.036)	(.037)	(.037)	(.037)	(.036)
Married/Partnered (1)	-.187	.000	-.002	.011	.004	.007	.007
	(.122)	(.037)	(.037)	(.037)	(.038)	(.037)	(.037)
Education	-.043	.030	.024	.034	.034	.033	.036
	(.077)	(.023)	(.024)	(.024)	(.024)	(.024)	(.024)
Age	-.026***	-.011***	-.010***	-.011***	-.011***	-.011***	-.011***
	(.004)	(.001)	(.001)	.001)	(.001)	(.001)	(.001)
Constant	3.285	1.207***	1.204***	1.300***	1.260***	12.44***	1.276***
Adjusted R^2	.054	.079	.083	.071	.073	.075	.075
F	7.494	18.246	19.246	16.471	16.565	17.406	17.275
Significance	.000	.000	.000	.000	.000	.000	.000

Standardized data weights used in analysis

b coefficient
(std.error)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05 **p< 0.01 ***p< 0.001

Religiosity, Race/Ethnicity and Moderate Exercise

The analysis of interactions between religiosity and race/ethnicity on moderate exercise provides several significant results. In model 2, main effects for religious participation (b= .229, sig. =.000) suggest that Whites who are involved in religious participation are different from those who are not, in their use of moderate exercise. There is also a significant difference in the use of moderate exercise among Whites based on their frequency of meditation (b= .141, sig. =.022). The main effects shown in models 1, 3, and 6, suggests that Hispanics are more likely to participate in moderate exercise, compared to Whites, when the level of religious activity is equals zero.

In model 2, there is a significant interaction effect between HISPANIC and religious participation (b= -.227, sig. =.017). Thus, the effect of religious participation on moderate exercise has a differential effect for Hispanics. Among this group, a one-unit increase in religious participation is associated with a decrease in moderate exercise.

Race/ethnicity did not moderate the effect of religiosity on moderate exercise for any other models. Age was shown to have a significant negative association with moderate exercise for all models (not shown).

Table 14B

Interaction Effects between Religiosity and Race/Ethnicity on Moderate Exercise

(OLS Regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.094 (.059)					
Religious Participation [a]		.229*** (.061)				
Prayer [b]			-.067 (.069)			
Meditation [b]				.141* (.336)		
Religious Scripture [b]					.062 (.070)	
Religious Media [b]						.029 (.067)
BLACK	.453 (.576)	.061 (.402)	1.153 (.964)	.461 (.439)	.905 (.518)	-.614 (.488)
HISPANIC	.633* (.318)	.071 (.242)	1.139* (.452)	.192 (.247)	.405 (.283)	.633* (.248)
RA X Black	.055 (.157)					
RA X Hispanic	.010 (.095)					
RP X Black		-.085 (.135)				
RP X Hispanic		-.227* (.095)				
Pray X Black			.228 (.222)			
Pray X Hispanic			.145 (.114)			
Med X Black				.069 (.139)		
Med X Hispanic				-.149 (.089)		
RS X Black					.224 (.165)	
RS X Hispanic					-.078 (.103)	
RM X Black						-.272 (.151)
RM X Hispanic						.024 (.100)
Constant	1.123[ns]	2.768**	-.802[ns]	1.902[ns]	.773[ns]	3.434**
Adjusted R^2	.054	.061	.050	.052	.054	.053
F	9.947***	11.147***	9.286***	9.383***	9.867***	9.813***
df	9	9	9	9	9	9

Standardized data weights used in analysis

b coefficient
(std. error)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05 **p< 0.01 ***p< 0.001

Religiosity, Gender and Moderate Exercise

In table 14C the results for main effects are shown in models 1, 2, and 4, suggests that there is a significant difference between women who attend religious service (b= .171, sig. =.005), are involved in religious participation (b= .062, sig. =.001), and meditate (b= .192, sig. =.001) and women who do not participate in these forms of religious activities, in participating in moderate exercise. Across models, it is shown that males are significantly more likely to participate in moderate exercise compared to females when the level of religious activity equals zero.

Interaction effects in models 3 and 4 show significant negative effects of prayer and meditation for males. Although males are significantly more likely to perform moderate exercise compared to females when the level of prayer equals zero, for every one-unit increase in prayer, males are 12% less likely to do moderate exercise. The effect of meditation on moderate exercise is associated with a 3% decrease in the likelihood of performing moderate exercise for males. Accordingly, the significant effect of meditation on moderate exercise is greater for females than males. Age is negatively associated with moderate exercise for all models.

Table 14C

Interaction Effect between Religiosity and Gender on Moderate Exercise

(OLS regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.171** (.061)					
Religious Participation [a]		.062** (.019)				
Prayer [b]			.159 (.084)			
Meditation [b]				.192** (.058)		
Religious Scripture [b]					.096 (.067)	
Religious Media [b]						-.005 (.048)
MALE	.859** (.294)	.182** (.069)	1.478** (.438)	.919*** (.229)	.640* (.268)	.468* (.189)
RA X Male	-.144 (.088)					
RP X Male		-.021 (.027)				
Pray X Male			-.281* (.109)			
Med X Male				-.220** (.083)		
RS X Male					-.088 (.098)	
RM X Male						-.035 (.063)
Constant	1.366**	.819***	1.337*	1.580**	1.672**	2.127***
Adjusted R^2	.056	.083	.054	.055	.053	.046
F	11.543***	16.914***	11.026***	10.991***	10.785***	9.353***
df	8	8	8	8	8	8

Standardized data weights used in analysis

b coefficient
(std. error)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05 **p< 0.01 ***p< 0.001

Moderate Exercise – Summary

Do religiosity and sociodemographic measures have an effect on moderate exercise?

Two measures of religiosity, service attendance and participation, had a strong significant with moderate exercise. Increased levels of participation in these forms of religiosity were related to an increase in moderate exercise. Hispanics were significantly less likely to participate in moderate exercise compared to Whites. Males were significantly more likely to participate in moderate forms of exercise compared to females. As age increased, levels of participation in moderate exercise decreased. Education and marital status were not significantly related to moderate exercise.

Does the effect of religiosity on moderate exercise differ by race/ethnicity?

Religious participation and meditation had a significant positive effect on moderate exercise for Whites. None of the religiosity measures had an effect on moderate exercise for Blacks. Religious participation had a significant negative effect on moderate exercise for Hispanics.

Does the effect of religiosity on moderate exercise differ by gender?

Religious service attendance, religious participation and meditation, had a significant positive effect on moderate exercise for females. There was a significant negative effect of prayer and meditation on moderate exercise for males. Increased levels of participation in these form of religiosity was associated with the decreased likelihood of performing moderate exercise among males.

Strenuous Exercise

Table 16 provides results of the effect of religiosity on strenuous exercise. Strenuous exercise involves participation in activities such as running, swimming, chopping wood, lifting

weights, aerobics, etc. In the full model (model 1) there was no significant association between religiosity measures and strenuous exercise. However, there was a significant association between each of the covariates and strenuous exercise. In assessing the individual measures of religiosity, religious service attendance (b=.039, $p<0.01$), religious participation (b=.042, $p<0.01$), prayer (b=.052, $p<0.01$), religious scripture (b=.061, $p<0.001$), and religious media (b=.016, $p<0.05$) were significant predictors of strenuous exercise. Meditation was the only measure that was not significantly related to participation in strenuous exercise.

For covariates there was a significant negative association among both variables for race/ethnicity, marital status, and age. Among the group labeled Black (1) and the group labeled Hispanic (1), for every one unit increase in race/ethnicity there was a decrease in strenuous exercise. Thus, Whites were significantly more likely to participate in strenuous exercise. Additionally, respondents who stated that they are in relationships other than being married or partnered were significantly more likely to participate in strenuous exercise. While higher education was significantly associated with increased participation in strenuous exercise an older age was significantly associated with a decrease in strenuous exercise.

Table 15A

Effects of Religiosity on Strenuous Exercise

(OLS Regression)

MODEL	1	2	3	4	5	6	7
Religious Attendance [a]	.022	.039**					
	(.064)	(.015)					
Religious Participation [a]	.033		.042**				
	(.059)		(.015)				
Prayer [b]	.054			.052**			
	(.065)			(.018)			
Meditation [b]	-.017				.017		
	(.046)				(.014)		
Religious Scripture [b]	.083					.061***	
	(.065)					(.016)	
Religious Media [b]	.031						.039*
	(.055)						(.016)
Black (1)	-.787***	-.236***	-.226**	-.241***	-.221**	-.239***	-.251***
	(.207)	(.066)	(.066)	(.066)	(.067)	(.066)	(.068)
Hispanic (1)	-.592***	-.219***	-.196***	-.213***	-.195***	-.200***	-.204***
	(.145)	(.046)	(.046)	(.046)	(.047)	(.046)	(.046)
Male (1)	1.165***	.385***	.376***	.405***	.378***	.396***	.384***
	(.122)	(.039)	(.039)	(.040)	(.040)	(.039)	(.039)
Married/Partnered (1)	-.307*	-.087*	-.090*	-.084*	-.083*	-.079*	-.085*
	(.123)	(.040)	(.040)	(.040)	(.041)	(.040)	(.040)
Education	.159*	.108***	.104***	.111***	.110***	.111***	.116***
	(.078)	(.025)	(.025)	(.025)	(.026)	(.025)	(.025)
Age	-.043***	-.015***	-.015***	-.016***	-.015***	-.015***	-.015***
	(.004)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Constant	2.959***	1.090***	1.101***	1.015***	1.147***	1.037***	1.108***
Adjusted R^2	.159	.184	.184	.188	.172	.188	.183
F	22.624	46.615	46.374	47.459	41.936	47.665	46.097
Significance	.000	.000	.000	.000	.000	.000	.000

Standardized data weights used in analysis

b coefficient
(std. error)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05 **p< 0.01 ***p< 0.001

Religiosity, Race/Ethnicity and Strenuous Exercise

Significant interactions of religiosity on strenuous exercise for racial/ethnic groups were found in only two models. In model 3, prayer (b= .258, sig. =.023) had a positive effect on moderate exercise for Hispanics. Among Hispanics, a one-unit increase in the frequency of prayer was associated with a 35% increased likelihood of performing some form of strenuous exercise. While Hispanics who participate in prayer are significantly different from those who do not, the main effect shows that they were also significantly more likely to participate in strenuous exercise compared to Whites when the levels of prayer equals zero.

In model 6, results show that religious media (b= -.349, sig. =.021) had a significant negative effect on strenuous exercise for Blacks. Thus, every one-unit increase in levels of religious media use was associated a 24% decreased likelihood of strenuous exercise participation. In model 5, Blacks and Hispanics were significantly more likely to perform strenuous exercise when levels of religious scripture reading equals zero.

Age and marital status were significant negative predictors of strenuous exercise. Thus, an increase in age and being married or partnered was associated with a decrease in strenuous exercise, for all models. Males were significantly more likely to perform strenuous exercise. In the models for prayer and religious media, education had a significant positive association with strenuous exercise (not shown).

Table 15B

Interaction Effect between Religiosity and Race/Ethnicity on Strenuous Exercise

(OLS regression)

Model	1	2	3	4	5	6
Religious Attendance [a]	.100 (.058)					
Religious Participation [a]		.111 (.061)				
Prayer [b]			.044 (.069)			
Meditation [b]				.042 (.062)		
Religious Scripture [b]					.089 (.069)	
Religious Media [b]						.080 (.066)
BLACK	1.021 (.574)	.253 (.402)	.398 (.958)	1.261** (.436)	1.196* (.513)	-.308 (.484)
HISPANIC	.722* (.318)	.746** (.243)	1.642*** (.450)	.461 (.249)	.918** (.281)	1.042*** (.246)
RA X Black	.078 (.156)					
RA X Hispanic	.010 (.095)					
RP X Black		-.178 (.135)				
RP X Hispanic		.057 (.095)				
Pray X Black			-.073 (.220)			
Pray X Hispanic			.258* (.114)			
Med X Black				.194 (.139)		
Med X Hispanic				-.067 (.090)		
RS X Black					.158 (.162)	
RS X Hispanic					.114 (.102)	
RM X Black						-.349* (.151)
RM X Hispanic						.193 (.100)
Constant	-.163^{ns}	1.341^{ns}	-.636^{ns}	-.020^{ns}	-.884^{ns}	1.958^{ns}
Adjusted R^2	.166	.166	.168	.155	.169	.172
F	32.239***	32.285***	32.621***	29.191	32.918	33.592
df	9	9	9	9	9	9

Standardized data weights used in analysis

b coefficient
(std.error)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05 **p< 0.01 ***p< 0.001

Religiosity, Gender and Strenuous Exercise

Although the results of all models show that males were significantly more likely to participate in strenuous exercise compared to females when the level of religious activity is zero, females who participated in various forms of religious activity were significantly more likely to participate in strenuous forms of exercise. Among females, religious service attendance (b= .146, sig. =.016), prayer (b= .176, sig. =.035), meditation (b= .202, sig. =.000), religious scripture reading (b= .197, sig =.003), and religious media (b= .124, sig. =.010), had an effect participating in strenuous forms of exercise.

Results provided in models 4 and 6 of table 15C show that meditation and religious media had a negative effect on strenuous exercise for males. Although the gender gap in performing strenuous exercise generally favors men, this difference was diminished for women who are very involved in meditation and religious media use. Thus, among men, a one-unit increase in meditation was associated with a 14% decrease in the likelihood of performing strenuous exercise. An increase in religious media was associated with a 7% decreased likelihood of strenuous exercise performance.

For all models, males were significantly more likely to perform strenuous exercise when the level of religious activity equals zero. An increase in age and being married or partnered was associated with a decrease in strenuous exercise use. Education was shown to have a significant positive association with strenuous exercise in models for prayer, meditation, religious scripture, and religious media (not shown).

Table 15C

Interaction Effects between Religiosity and Gender on Strenuous Exercise

(OLS regression)

MODEL	1	2	3	4	5	6
Religious Attendance [a]	.146* (.061)					
Religious Participation [a]		.109 (.060)				
Prayer [b]			.176* (.083)			
Meditation [b]				.202*** (.058)		
Religious Scripture [b]					.197** (.066)	
Religious Media [b]						.124* (.048)
MALE	1.355*** (.293)	1.105*** (.224)	1.502** (.437)	1.937*** (.230)	1.382*** (.266)	1.567*** (.188)
RA X Male	-.075 (.087)					
RP X Male		-.002 (.086)				
Pray X Male			-.087 (.109)			
Med X Male				-.353*** (.083)		
RS X Male					-.094 (.097)	
RM X Male						-.188** (.063)
Constant	.311[ns]	.623[ns]	.080[ns]	.460[ns]	.304[ns]	.597[ns]
Adjusted R^2	.167	.165	.166	.165	.169	.164
F	36.368***	35.924***	35.958***	35.028***	36.942***	35.142
df	8	8	8	8	8	8

Standardized data weights used in analysis

b coefficient
(std.error)

[a] 1 = Never
5 = Several times a week

[b] 1 = Never
5 = Several times a day

*p< 0.05 **p< 0.01 ***p< 0.001

Strenuous Exercise – Summary

Do religiosity and sociodemographic measures have an effect on participating in strenuous exercises?

The results shown in OLS regression models showed a significant positive association between using strenuous forms of exercise and religious service attendance, religious participation, prayer, reading religious scripture, and using religious media. Meditation was the only religiosity measure found to be insignificant. The result of the covariates used in each model show that Blacks and Hispanics were significantly less likely to perform strenuous exercise compared to Whites. Additionally, males and those with higher levels of education were more likely to do strenuous forms of exercise. On the other hand, an increase in age and being married or partnered was associated with a decrease in participating in strenuous forms of exercise.

Does the effect of religiosity on participating in strenuous exercise differ by race/ethnicity?

For Whites, there was no effect of religiosity on the use of strenuous forms of exercise. In table 15B, there were only two models in which significant interaction effects were noted. Based on the results shown in model 3, the effect of prayer on using strenuous forms of exercise was positive for Hispanics. The effect of religious media use on using strenuous forms of exercise was negative for Blacks.

Does the effect of religiosity on participating in strenuous exercise differ by gender?

Religious attendance, prayer, meditation, religious scripture, and religious media had a positive effect on participation in strenuous exercise for females (see table 15C). For males, the effect of meditation and religious media had a significant negative effect on participation in

strenuous exercise. In that, men who participate in these forms of religious activities were more likely to have a decreased participation in strenuous forms of exercise.

CHAPTER 7

Discussion and Conclusions

Previous researchers have established that religious involvement has a beneficial effect on health. Durkheim, was the first sociologist to discuss the social impact of religion, noting that religious institutions provided a source of social cohesion (closeness) within a society that experienced a loss of norms and values (Koenig, 2001). In his study on suicide, Durkheim focused on differences in the rate of suicide among various religious groups. Thus, his approach to studying the religion-health association treated religion as a characteristic of groups, not individuals. As the study of religion and health evolved, religiousness came to be treated as a characteristic of the individual (Idler et al., 2009). Consequently, researchers began to take a unidimensional approach to the study of religiosity using religious service attendance as the primary measure. Research on religion and health continues to be a growing area of interest, and for the most part, the study of religiosity has moved beyond the scope of service attendance with other public and private measures of religiosity being explored. Nonetheless, researchers have failed to expand their analysis of religiosity to include multiple public and private measures, within a single study.

This research addressed this gap and describes the association between multiple measures of religiosity and multiple measures of health behavior. Independent variables used to measure religiosity included religious service attendance, religious participation, prayer, meditation, religious scripture reading, and religious media use. Health behavior was assessed using measures of physical exam, dental care, vitamin use, alcohol abstention, drinking abstention, walking activity, moderate exercise, and strenuous exercise. Covariates used in all analyses included race/ethnicity, gender, age, education, and marital status. Seven models were created

for each of the eight outcomes. The first model for each outcome included all religiosity predictors and all covariates. Since multicollinearity can cause an issue with correlations among independent variables, the results of full models are not discussed. Subsequent models included an individual analysis of each religiosity measure with all covariates. Interaction terms were also used to assess the effect of religiosity on health behavior for gender and racial/ethnic groups. Statistical analyses were conducted using SPSS - Logistic and OLS regressions. The data for this study were obtained from the 2004 Study of Texas Adults (Marc Musick, University of Texas – Austin). The original data were collect from 1504 participants using a modified random digit dialing design. Analyses for the present study were conducted using 1417 participants consisting of 105 Blacks, 976 Whites, and 336 Hispanics, adults 18 and over, residing in Texas.

Public Religiosity and Health Behaviors

Table 16 provides a summary of the findings for all analyses. The results for basic logistic and OLS regressions show that public religiosity is related positive health behaviors for all models. Thus, increased levels of involvement in religious service attendance and religious participation are associated with the increased likelihood of positive health behavior, for all models. The consistency of these associations may be related to the social capital these sources of participation have the possibility to provide. Carpiano (2008) defines social as the entirety of actual or potential resources an individual has access to. These resources depend on belonging to certain groups. Since public religious participation generally involves interaction with others, it can serve as a means of receiving and exchanging resources, information and forming networks that may be beneficial to health.

Although previous studies have shown that Blacks have the highest frequency of public religious activity, the results of the present study do not suggest that religion is associated with a

beneficial effect on health for this group. For the most part, results suggest that there is no difference between frequent attenders and infrequent attenders as it relates to health behaviors. The only significant interactions show that Blacks who have higher levels of public religiosity are less likely to have dental care. There are many assumptions that can be made about these results but the underlying significance of this association cannot fairly be defined through the interpretation of cross-sectional data. Whites are shown to benefit most from frequent religious participation. Interestingly, both measures of public religiosity are related to an increased likelihood of smoking and drinking abstention for Whites with high levels of religiosity compared to Whites who are infrequent participants. While there are significant interactions for Whites related to preventive health and exercise, these findings are inconsistent. Among Hispanics, the most consistent interaction is found for measures on preventive health. Thus, when Hispanics have higher levels of public religiosity, they are more likely to participate in certain forms of preventive health, such as having a physical exam. The most interesting outcome for this group is for drinking and smoking abstention. Although results show that there are no significant findings on these measures, more in-depth research may find that this lack of relationship between public religiosity and drinking and smoking abstention for Hispanics may reflect cultural norms and values held by this group.

The interaction effects for gender groups show that public religiosity tends to be more beneficial for females than for males. As it relates to preventive health, it is important to note that the results for the model on gender (table 8C) shows that although women are more likely to have a physical exam compared to men, the difference between men and women is smaller among those who have high levels of religious service attendance or religious participation. Thus, the gender gap which generally favors women is attenuated for men that are very involved

in religious activities. These results concur with the findings of Maselko & Kubzansky (2006) who report that the relationship of weekly public religious activity was more strongly related to better health and well-being for men than women.

Private Religiosity and Health Behaviors

Results for basic logistic and OLS regressions show that religious scripture reading is the form of private religiosity that is most consistently associated with positive health behaviors. Although prayer, meditation, and media use were found to be significant for some models, these findings were inconsistent. Across all measures, private religiosity was shown to be inconsistently associated with health behaviors. One notable outcome is for Blacks, for whom there were only five significant associations, three of which were negative. These negative interactions suggest that increased levels of participation are associated with the decreased likelihood of positive health behavior. Whites are shown to benefit most from participation in private religiosity. Other notable outcomes are the significant interactions for private religiosity and alcohol abstention for Whites and the significant interactions for vitamin use and strenuous exercise among females. For members of these groups with high levels of private religiosity are more likely to have positive health behaviors compared to the members of these groups with low religious involvement. Overall, it seems that the effect of public and private religious involvement on health is most beneficial for White respondents and women. One clear pattern is that there is less of an impact of religious participation and positive health behaviors among Black respondents. Due to complexity of the religion-health association it is impossible to base the outcomes of these results on any one theory. More research should be done to explore the mechanisms by which many of these unforeseen results may be explained.

Table 16

Summary Table of Results

Preventive Health
(Logistic)

	Logistic			Interactions	Blacks			Whites			Hispanics			Females			Males		
	PE	DC	V		PE	DC	V	PE	DC	V	PE	DC	V	PE	DC	V	PE	DC	V
Attendance	+	+	+			-			+	+	+					+	+		
Participation	+	+	+			-			+		+	+	+			+	+		
Prayer	+		+							+	+				+	+		-	
Meditation			+		+	+				+						+			
Scripture	+	+	+							+	+					+			
Media			+									+	+			+			+

PE= physical exam; DC=dental care; V=vitamin use

Abstention
(Logistic)

	Logistic		Interactions	Blacks		Whites		Hispanics		Females		Males	
	A	S		A	S	A	S	A	S	A	S	A	S
Attendance	+	+				+	+			+	+		
Participation	+	+				+	+				+		
Prayer	+			-		+					+	+	
Meditation	+			-		+				+			
Scripture	+	+				+	+			+	+	+	
Media	+					+				+		+	

A= alcohol abstention; S= smoking abstention

Exercise
(OLS)

	OLS			Interactions	Blacks			Whites			Hispanics			Females			Males		
	W	M	S		W	M	S	W	M	S	W	M	S	W	M	S	W	M	S
Attendance	+	+	+					+						+	+	+			
Participation	+	+	+					+	+			-		+	+				
Prayer	+		+										+	+		+		-	
Meditation	+								+						+	+		-	-
Scripture	+		+					+						+		+			
Media	+		+				-				+					+			-

W= walking; M= moderate; S= strenuous

sign (+) equals significant positive association
sign (-) equals significant negative association
blank space indicates no association

Religiosity. The results of this study showed that many forms of religiosity are associated with health behavior. Logistic and OLS regression results indicated that religious service attendance and religious participation were positively associated with health behavior across all models. Thus, an increased level of religious activity was associated with positive health behavior. While the results of this study support previous findings on the influence of service attendance on health behavior (Gillum, 2005), this study is the first to describe the effect of religious participation on several forms of health behavior. Albeit, religious service attendance and participation were positively associated with health behaviors, this effect was not significant for all groups. Results of interaction terms created for these measures showed that religiosity had a differential effect for gender and race/ethnic groups. Of all measures of religiosity shown to have an effect on preventive health measures (physical exam, dental care, and vitamin use) for racial/ethnic and gender groups, religious participation provided the most consistent effect. Religious scripture reading had the most significant effect on alcohol and smoking abstention. Interactions between religiosity and moderating variables showed that prayer and meditation were most frequently associated with exercise measures: walking, moderate exercise, and strenuous exercise. It is important to note that while religiosity was usually shown to have a positive effect on health behavior among groups, there are a few instances in which the effect was negative. For example, religious service attendance was shown to have a positive effect on dental care for Whites and a negative effect on dental care for Blacks. Thus, while Whites who frequently attended religious service were significantly more likely to seek dental care than Whites who never attended, Blacks with high levels of religious attendance were less likely to seek dental care compared to Blacks who never attend.

Overall, these results show that "religiosity" cannot be measured simply by a single measure. In order to get a better perspective of the effects of religiosity on health behavior, multiple measures of religiosity should be considered. While many traditional forms of religious practice, such as attendance and prayer, have been shown to contribute to well-being, the growing trend toward the access to religious media, particularly television ministry, makes it especially important as an indicator of religiosity.

Additionally, it is just as important to provide analyses that describe difference *within* groups as it is to describe differences *between* groups. For example, the results presented in Table 9A showed that service attendance had a positive influence on dental care and, Blacks were significantly less likely to have a dental care compared to Whites. Moreover, the interaction between religiosity and race/ethnicity demonstrated that for Blacks, religious service attendance had a significant negative effect on the likelihood of having dental care (table 9B).

Race and Ethnicity. Although Blacks are more religious compared to the U.S. population (PEW, 2009), the results of this study show that religious involvement does not seem to have a substantial influence on health behaviors among this group. It is possible that small number of Blacks in the study made it impossible to find the impact of religiosity for this group. Meditation was the only religious activity that had a positive interaction on health for Blacks. Thus, Blacks who had high levels of participation in this form of religious activity were significantly more likely to have a physical exam and dental care, compared to Blacks who had low levels of meditation. It was rather surprising to find that for Blacks, most significant effects of religiosity on health behavior were negative. Thus, among Blacks who had high levels of service attendance and religious participation there was a decreased chance on them having dental care compared to Blacks who had low levels of participation. Furthermore, the effect of

prayer and meditation were negative for alcohol abstention and the effect of media use was negative for strenuous exercise. All other models showed that there was no significant effect of religiosity on health behavior for Blacks. At a national level Blacks have been noted as having higher levels of religious affiliation, service attendance, prayer, and shown to be more likely to state that religion is import to their daily life. However, based on the results of the present study, religious activity was not shown to have a differential effect for most measures of health behavior for this group.

The inclusion of Hispanics in this study is important for as of July 2011, they were noted as being the largest race or ethnic minority in the United States (CDC, Minority Health, 2013). For Hispanics, religious involvement seems to have the most beneficial effect on the use of preventive health care. Hispanics with frequent service attendance, religious participation, prayer, and scripture reading were more likely to have certain positive health behaviors. While religious participation also had an effect on moderate exercise, it was negative. Thus, for Hispanics, an increase in religious participation was associated with a decreased chance of performing moderate exercise. A few other measures of religiosity were shown to have a positive effect on dental care, vitamin use, walking, and strenuous exercise. Among Hispanics, all interaction analyses for smoking and drinking abstention were insignificant. This suggests that there is no difference between Hispanics with high levels of religiosity and Hispanics with low levels of religiosity in their likelihood of abstaining from drinking and smoking. While these outcomes may be explained by socio-cultural values of Hispanics, further research should be conducted to explore this lack of association. Based on a study conducted by Fenelon and Blue (2011), the Hispanic Paradox – the unexplainable tendency for US Hispanics to live longer

and healthier despite their increased poverty and lack of education and wealth – can be explained by lower smoking prevalence and mortality among this group.

For Whites, many forms of religiosity had a positive effect on many health behaviors. Thus, Whites who had high levels of religious activity were more likely to participate in positive health behaviors compared to Whites who had low levels of religious activity. Physical exams and performing strenuous exercise were the only health measures that were not influenced by religiosity among this group. Additionally, this is the only racial/ethnic group for which there were no negative effects of religiosity.

Overall, interactions between religiosity and race/ethnicity showed that various forms of religious activity had a differential effect on many health behaviors for all racial/ethnic groups. However, this effect was most beneficial for Whites. Although it has been noted that Blacks are more religiously active, this study provides very little evidence to show that religiosity is beneficial to health behavior for this group. While the effects of religiosity seem to be less beneficial for Hispanics compared to Whites, Hispanic's lack of participation in high-risk activities, such as smoking, is associated with a longevity advantage among this group. Based on the Hispanic Paradox, although Hispanics have a lower SES compared to Whites, their low rate of participation in negative health practices, particularly smoking, has led to their increased longevity.

Gender. In the United States, men are more likely to participate in risky health behaviors and adopt beliefs that contribute to differences in the rate of morbidity, mortality, and longevity compared to women (Courtenay, 2000). The results of this study support previous findings in describing the beneficial effects of religiosity on health for females. Even without regard to religiosity, women were shown to have a tendency towards positive health behavior. Having a

physical exam was the only health measure for which no measure of religiosity had an effect. Since women are known to utilize preventive screenings and exams, it is not surprising to see that levels of religious participation did not influence this behavior. Many forms of religiosity were shown to have a differential effect on many health behaviors for women. For males, most significant effects of religiosity were negative. These negative effects were found in the models for moderate exercise, strenuous exercise, and dental care. Thus, an increase in participation in some forms of religiosity decreased the likelihood of positive health behavior. The results of several models show that religiosity has a beneficial effect for males. Results in table 8C show that females were significantly more likely to have a physical exam when groups have infrequent religious attendance (model 1) and religious participation (model 2). Interestingly, significant interactions show that males who had frequent participation in the aforementioned forms of religiosity were no different from females in having a physical exam. Thus, while females tended to benefit most from participation in religious activities, some forms of activities can be beneficial to the health behavior of males. This suggests that the effects of religiosity may not override the effects of masculinity.

Strengths, Limitations, and Direction for Future Research

Strengths. The 2004 Survey of Texas Adults (STA) dataset was selected based on a number of factors. One of the major strengths of this dataset was the availability of a variety of religious and health measures that could be used for analysis. Another factor in selecting this data related to the high frequency of responses among the participants for each of the variables used. Moreover, the sample size for African American males was sufficient to be included in the multivariate analyses. While numbers representing African American's appear to be small, numbers obtained for the weighted sample were based on the population characteristics provided

by the 2004 U.S. Census statistics for the State of Texas. This sample also contains a large population of Hispanic/Latino participants, as it reflects the ethnic composition of Texas.

Limitations/Future Research. With the use of secondary data, the researcher has no means of obtaining a clear understanding of vaguely conceptualized terms. For example, when asked "do you regularly take vitamins or other dietary supplements for your health?" the term "regular" is likely to be answered based on one's subjective understanding of the term. There are several limitations that were discussed in previous studies which utilized the 2004 Survey of Texas Adults. This dataset was used by Hill (2006 & 2007) and he has noted the potential for bias due to social desirability is a limitation of the study. Although the individual responses rate for this sample was 89%, Hill stated that the household response rate of 37% served as a limitation to the study. A small sample size for Blacks made it impossible to assess the interaction effects of religiosity on health behavior based on race by gender. Geographically, sampling was restricted to those who resided in the State of Texas. For this reason, findings may not be generalizable to the population outside of this locale. Moreover, the collection of national data may provide an opportunity for researchers to make geographic comparisons of other Bible-belt states such as Texas, to other regions. Although it is a limitation of this study, future studies should assess how social capital that may be gained as a result of religious participation, impacts health behavior. For example, do people who participate in public forms of religious activity have access to social networks, information, and resources that non-attendees do not have? This study did not include assessments of two important financial resources: access to medical and dental insurance and income status. Although research has shown that Blacks, males, and younger adults, underutilize preventive health care services, an assessment should be made to determine if this is associated with lack of economic resources. This study also failed to make an

assessment of perceived health status, this information may provide an opportunity to explain significant negative associations such as the negative interaction between media use and strenuous exercise among Blacks.

Future study should conduct a study of this magnitude using a national sample. Although using a cross-sectional research design allows the researcher to determine whether or not an association exists between variables, limitations of this design relates to the inability to determine causality. Longitudinal studies are needed to determine whether positive health behaviors are the direct result of frequent religious involvement, or vice versa. Data from longitudinal studies may also help address questions of why religiosity has a negative effect on health behavior for some groups. Additionally, the use of qualitative methods may provide researchers with opportunity to gain in-depth information about significant findings. For example, researchers may be able to obtain more information about the underlying nature of significant negative associations between religiosity and health behaviors such as attendance and participation among Blacks, and prayer and dental care among males. Respondents in this sample were largely affiliated with the Protestant and Catholic denomination. Future studies should consider the effect of religious activity on health behavior among specific religious affiliations and other non-Christian groups.

***Policy Implications*.** Much research has been dedicated to the study of religion and health. However, for many studies, religious service attendance has served as a proxy for measures of "religiosity." The results provided by this dissertation shows that while public and private forms of religiosity are have a significant effect on health behavior, public religiosity is shown to be most consistently associated with positive health behaviors. Of private religiosity measures tested in this study, religious scripture reading was shown to have the most consistent

effect on health behaviors. Measures such as prayer, meditation, and media use were significant for some measures but this relationship was inconsistent across models. When looking at the impact of religiosity on health behaviors based on race/ethnicity and gender, results from this study are surprising considering what may have been expected based on information obtained from previous studies. For Blacks, the results of this sample showed that higher levels of religious service attendance was not a significant predictor of engaging in healthier behaviors, although it has been noted that this group is the most religiously active. Participation in public and private religiosity appears to be most beneficial to the health behaviors of Whites. Among Hispanics, high levels of participation in public religiosity inconsistently predicts positive health outcomes and high levels of participation in private forms of religiosity seldom predicts positive health outcomes. The results of this study have provided insight on how participation in public and private forms of religiosity is associated with positive health behaviors among groups. The results of a national surveys suggests that although 97% of religiously affiliated respondents stated that they believe in God, 47% reported frequent worship attendance (PEW, October 2012) for those who attend religious services, religious institutions should continue to provide messages and resources with focus on the importance of maintaining a healthy lifestyle. Although the results of this study have answered questions addressing gaps in the religion-health association, many questions were generated as consequence. Taking a qualitative or longitudinal approach to further study intrinsic aspects of religiosity – coping through spiritual beliefs and positive feeling (Zini et al., 2012) may provide a better understanding of the negative effects of religiosity on health behavior. Health behavior practices are related to long term health outcomes. A healthy individual makes for a healthy society. Religious institutions must

continue to provide a platform where networks can be created and resources can be shared which contribute towards the improvement of healthy living.

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ABSTRACT

ASSESSING THE INFLUENCE OF RELIGIOUS INVOLVEMENT ON HEALTH BEHAVIORS AMONG GENDER AND RACIAL/ETHNIC GROUPS

by

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May 2014

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Major: Sociology (Medical)

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The purpose of this study was to assess the relationship between measures of public and private religiosity and various measures of health behavior. Previous studies have shown that religious involvement is associated with health outcomes (Koenig & Vaillant, 2009; Chatters, 2000; Meisenhelder, 2003). However, many studies use religious attendance as the single measure of religiosity This research used multiple indicators of religiosity that reflected both public and private dimensions in order to predict various health behaviors, including preventive health behaviors, abstention from alcohol and smoking, and physical activity. In addition to taking a multi-dimensional approach to assessing the religion-health relationship this study described the effects of religiosity on health behaviors for racial/ethnic and gender groups.

Data were obtained from the 2004 Survey of Texas Adults (Musick, 2005). Logistic regression and OLS regression models were used to estimate the effects of 6 independent measures of religiosity on 8 independent measures of health behavior. Religiosity measures included two public dimensions: service attendance and religious participation; and 4 private dimensions: prayer, meditation, and religious scripture reading. Health behavior measures

included: preventive care measures (physical exam, dental care, and vitamin use), abstention measures: (alcohol and smoking), and exercise measures: (walking, moderate exercise and strenuous exercise). Interactions describing the effect of religiosity on health behaviors for gender and racial/ethnic groups were also assessed.

Results of the analyses showed that public measures of religiosity, attendance and participation, were consistent predictors of positive health behaviors in logistic and OLS models. However, interaction models found that both public and private forms of religiosity have inconsistent effects on health behaviors for gender and racial/ethnic groups. In some types of health behaviors among Blacks, Hispanics, and males, religiosity had a negative effect on heath behavior.

The results of this study show that researchers cannot take a unidimensional approach in studying the effects of religiosity. While both public and private religious activity had beneficial effects on some measures of health behavior, these findings were inconsistent across gender and racial groups.

AUTOBIOGRAPHICAL STATEMENT

Charlotte Winston was reared by her grandmother in Detroit, Michigan. She attended Detroit Public Schools and graduated from Detroit Central High School on the city's West-side. After graduating from high school, Charlotte started a family and traveled the world with her husband, who was a serviceman in the United States Navy. Although she failed at an attempt to attend college right out of high school, she maintained a desire to earn a college education. Years later, after becoming a mother of three and returning home to civilian life, Charlotte found an opportunity to fulfill her dream.

Charlotte started Wayne State University in 1995 through the City of Detroit's Job Training Partnership Act program (JTPA). Through the guidance and encouragement of WSU mentors, Charlotte was able to overcome the challenges of being a non-traditional student. With hard work and dedication, Charlotte was able to later be funded through a National Institutes of Mental Health – Career Opportunities in Research (NIMH-COR) Fellowship. This fellowship provided Charlotte with her first exposure to the field of research. In December 1999, Charlotte earned her Bachelor of Science in Psychology and entered the workforce. After only a few years, she began to feel a void that could only be fulfilled by furthering her education. At that moment, she decided that in order to be successful and happy in a career, she would need to return to school.

In 2004, Charlotte was accepted into the Sociology program at Wayne State University where she earned her Master's degree in 2007 and PhD in May of 2014. She attributes her accomplishments to the Initiative for Maximizing Student Diversity (IMSD) and the Graduate School, where she received her graduate fellowship and assistantship. Charlotte states that this path has been no choice of her own, but the path that God has destined for her. Since her return to college she has had opportunities to conduct research, present at many conferences, attend many professional development conferences/workshops, teach, and serve as a mentor to undergraduate students. These experiences have allowed her to gain insight on who she is as a first generation college graduate and a contributor to the good of society, in quoting one of her favorite biblical scriptures "to whom much is given, much is required," she knows that much is required and expected of her. Although Charlotte has years of teaching experience, which she has greatly enjoyed, she wants to gain full-time employment in academe as an academician, academic administrator or in an area of student affairs – so long as she can remain a source of encouragement, motivation, and resource to others working towards fulfilling their dreams.